LEVEL II

REPORT MEDDH-288 (R1)

US ARMY MEDICAL RESEARCH AND DEVELOPMENT REPORT

Colonel Charles M. Dettor

US ARMY MEDICAL BIOENGINEERING RESEARCH and DEVELOPMENT LABORATORY
Fort Detrick
Frederick, Md. 21701

1 October 1977

267p.

Annual Progress Report, 1 October 1976 - 30 September 1977

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US ARMY MEDICAL RESEARCH AND DEVELOPMENT COMMAND
FORRESTAL BUILDING
WASHINGTON, DC 20314

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Health Standards for Military Pollutants
Combat Medical Materiel
Pest Management

20. ABSTRACT *(Continue on reverse side if necessary and identify by block number)*

The Annual Progress Report, Fiscal Year 1977 summarizes research performed by the US Army Medical Bioengineering Research and Development Laboratory in projects authorized by The Surgeon General, US Army, and the Commander, US Army Medical Research and Development Command; and supported by RDTE funds from the US Army Medical Research and Development Command.

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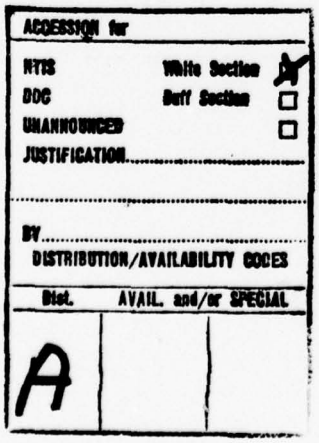
PREFACE

The mission of the US Army Medical Bioengineering Research and Development Laboratory (USAMBRDL) is to conduct engineering research and development of military medical equipment on a continuing basis for the Army and on an "as required" basis for the Navy and Air Force; conduct The Surgeon General's RDT&E program in integrated pest management systems to include materials, methods, equipment and concepts; responsible for the construction of initial pilot prototypes, test models, and production of limited quantities of medical materiel to support urgent military requirements; and conduct environmental health engineering research in support of The Surgeon General's responsibilities in air and water pollution control and solid waste and pesticide disposal to include management of the intramural and intermural portions of the USAMRDC Environmental Quality Protection Program.

The program of the USAMBRDL is directed toward the development and evaluation of medical items required primarily for field use by the Army; toward the evaluation of military pest management program and equipment; and toward the research, development and evaluation of air, land, and water pollution control techniques and solid waste and pesticide disposal techniques. The USAMBRDL's programs on biomaterials, biomechanical devices, and wound healing were terminated early in this report period when those portions of the Laboratory's mission were eliminated by budgetary constraints.

The research and development projects of the USAMBRDL are divided into tasks and work units and are covered by Research and Technology Work Unit Summaries (DD Forms 1498).



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HEALTH STANDARDS FOR MILITARY POLLUTANTS

3E762720A835

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA 0B 6186	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
76 10 01	D. CHANGE	U	U	NA	NL	☒ YES ☐ NO	A. WORK UNIT

10. NO. CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62720A	3E762720A835	00	121
b. CONTRIBUTING				
XXXXXXXXX	CARDS 114f			

11. TITLE (Precede with Security Classification Code) (U) Development and Application of Gas Chromatography/Mass Spectrometer Techniques for Army Environmental Studies

12. SCIENTIFIC AND TECHNOLOGICAL AREAS* 008700 Laboratories, Test Facilities and Test Equipment; 008300 Inorganic Chemistry; 012100 Organic Chemistry

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7610	CONT	DA	C. In-House

17. CONTRACT/GRANT
a. DATES/EFFECTIVE: EXPIRATION:
b. NUMBER:*
c. TYPE: d. AMOUNT:
e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR	PRECEDING 77	0.8	29
	CURRENT 78	1.0	30

19. RESPONSIBLE DOD ORGANIZATION
NAME:* US Army Medical Bioengineering Research & Development Laboratory
ADDRESS:* Fort Detrick, Frederick, MD 21701

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21. GENERAL USE
Foreign Intelligence Not Applicable

20. PERFORMING ORGANIZATION
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SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS
NAME: Chang, Y.H.
NAME: POC:DA

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Identification; (U) Mass Spectrometry; (U) Gas Chromatography/Mass Spectrometry; (U) Analysis; (U) Pesticides; (U) Water

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To adapt the present instrumentation for use with capillary gas chromatographic columns. To support other in-house or extramural research projects through the identification of unknown compounds in the areas of pesticide disposal, trace organics in water, hazardous waste disposal, and installation restoration standards.

24. (U) Techniques for using capillary columns will be applied from the literature and from other laboratories actively engaged in capillary gas chromatography/mass spectrometry. Analytical approaches will be tailored to meet specific requirements for determination of unknowns as they occur.

25. (U) 7610 - 7709. Dimer formation was observed in the ion source of the mass spectrometer. The reason for this is believed to be molecular reactions resulting from high concentrations in the source. Sulfotep was identified in diazinon formulations. Support of analytical methods to determine low concentrations of products of ozonation in waters intended for nonconsumption reuse continues.

*Available to contractors upon originator's approval.

DD FORM 1 MAR 68 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A, 1 NOV 65 AND 1498-1, 1 MAR 68 (FOR ARMY USE) ARE OBSOLETE. ★ U.S. GPO: 1974—540-943/8691

DETAIL SHEET

TITLE: Development and Application of Gas Chromatography/Mass Spectrometry Techniques for Army Environmental Studies

WORK UNIT NO: 121

AGENCY ACCESSION: DAOB 6186

PROGRESS

The gas chromatograph/mass spectrometer (GC/MS) was used to identify various impurities in chemicals intended for toxicological testing. Diazinon was found to contain sulfotep. Diisopropyl methyl phosphonate (DIMP) was found to contain various impurities, including diisopropyl phosphite, diisopropyl ethyl phosphonate, diisopropyl isopropyl phosphide and triisopropyl phosphate. Dicyclopentadiene (DCPD) was analyzed and found to contain various alkanes and alkenes C_5 - C_6, isomeric dicyclopentadienes, an alcohol and ketone derivative of dicyclopentadiene and tricyclopentadiene.

In the course of studying DIMP it was noted that neat injections of DIMP resulted in the formation of DIMP dimers in the source of the mass spectrometer. By co-injecting DIMP with other phosphonates, varying the transfer line temperatures and source temperature, the formation of the dimers in the source was confirmed.

In determining organic compounds in wastewater intended for reuse, several derivatization techniques were used. The GC/MS was used to confirm the pentafluorobenzyl derivatives and trimethyl silyl derivatives of various low molecular weight organic acids.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION* DA 0B 6187	2. DATE OF SUMMARY* 77 10 01	REPORT CONTROL SYMBOL DD-DR&E(AR)636
3. DATE PREV SUM'RY 76 10 01	4. KIND OF SUMMARY D. CHANGE	5. SUMMARY SCTY* U	6. WORK SECURITY* U	7. REGRADING* NA	8a. DISP'N INSTR'N NL	8b. SPECIFIC DATA - CONTRACTOR ACCESS [X] YES [ ] NO	9. LEVEL OF SUM A. WORK UNIT

10. NO. CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62720A	3E762720A835	00	122
b. CONTRIBUTING				
XXXXXXXXXX	CARDS 114f			

11. TITLE (Precede with Security Classification Code)*

(U) Hazard Ranking and Allocation Methodology Management

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

011700 Operations Research; 005900 Environmental Biology; 01680 Toxicology

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7610	7810	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR	PRECEDING 77	0.3	10
	CURRENT 78	0.3	10

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

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20. PERFORMING ORGANIZATION

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PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* Small, M.J.

TELEPHONE: (301) 663-7207; AUTOVON 343-7207

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Pearson, J.G.

NAME: POC:DA

21. GENERAL USE

Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Systems Analysis; (U) Toxicology; (U) Environmental Models; (U) Munitions; (U) Installation Restoration

23. TECHNICAL OBJECTIVE.* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) Stanford Research Institute, under Contract DAMD 17-75-C-5071, has devised a systems analysis approach to rank environmental hazards from Army-unique or relevant pollutants and recommend resource allocations to most efficiently formulate standards criteria. This project will provide the means to operate the software, to update the data inputs necessary for its most credible execution and update the analysis algorithms to keep pace with changing philosophies and hazard areas that can be addressed.

24. (U) Data bases will be updated for waste discharges from Army Ammunition Plants and for Rocky Mountain Arsenal. The methodology will be exercised to analyze proposed Laboratory projects involved with standards development for munitions-discharge and installation restoration.

25. (U) 7610 - 7709. The allocation software program developed by Stanford Research Institute was installed and debugged. Two revisions were made: the first processes hazard distributions as log-normal; the second allows computation of research allocation for programs that involve no specific chemical. An initial standardized approach to data sources, data assessment, and uncertainty assignment has been prepared for a technical report.

*Available to contractors upon originator's approval.

DETAIL SHEET

TITLE: Hazard Ranking and Allocation Methodology Management

WORK UNIT NO: 122

AGENCY ACCESSION: DAOB 6187

PROGRESS

The allocation software program developed by Stanford Research Institute was installed in December 1976 and debugged. Two revisions were made in FY77. The first, in June 1977, processed hazard distributions as log normal distributions. This was done after an analysis of the previous version (normal distribution) showed the computer mean hazard was biased increasingly to the high side with increasing uncertainty. With a log-normal distribution, the mean hazard tended to approach its expected value and the uncertainty computed was reasonable. The second, in September 1977, computed concentration and concentration uncertainty for situations where concentration was not an explicit input. This permitted processing of programs which reduced the uncertainty of concentration.

A study of hypothetical results indicated that consistent rankings occurred after about 50 Monte Carlo trials; over 100 were needed to lend credence to quantitative computations.

A need was determined for reasonably consistent assessments of data so evaluator bias would be reduced. This, coupled with an evaluation of data sources and translations to program format, was the basis for a technical report now in preparation.

The Rocky Mountain Arsenal data base demographic data were received from the Project Manager to Chemical Demilitarization and Installation Restoration, but has not yet been processed. The data base for the air and surface water pollutants in the vicinity of active explosive-producing ammunition plants has been assembled.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA 0B 6188	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
76 10 01	D. CHANGE	U	U	NA	NL	[X] YES [ ] NO	A. WORK UNIT

10. NO. CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62720A	3E762720A835	00	123
b. CONTRIBUTING				
XXXXXXXXX	CARDS 114f			

11. TITLE (Precede with Security Classification Code)* (U) Screening of Munitions-Related Chemicals for Acute Toxicity to Aquatic Organisms

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*
005900 Environmental Biology; 016800 Toxicology

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7610	7809	DA	C. In-House

17. CONTRACT/GRANT
a. DATES/EFFECTIVE: EXPIRATION:
b. NUMBER:*
c. TYPE: d. AMOUNT:
e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR	PRECEDING 77	0.9	29
	CURRENT 78	1.4	54

19. RESPONSIBLE DOD ORGANIZATION
NAME:* US Army Medical Bioengineering Research & Development Laboratory
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20. PERFORMING ORGANIZATION
NAME:* US Army Medical Bioengineering Research & Development Laboratory
ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)
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TELEPHONE: (301) 663-2036; AUTOVON 343-2036
SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS
NAME: Meier, E.P.
NAME: Pearson, J.G.
POC:DA

21. GENERAL USE
Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code)
(U) Munitions; (U) Aquatic Biology; (U) Aquatic Toxicology; (U) Pollution

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To determine the relative toxicity of munitions-related compounds being utilized at/or discharged by Army installations.

24. (U) Work will be divided into three categories: Quality assurance-selected compounds currently being tested under contract by USAMRDC will be tested and data compared to contractor data. Screening tests - the relative acute LC50's of a large series of compounds will be determined in static systems to select those compounds which require additional work. Acute toxicity testing - complete static and flow-through acute toxicity tests will be conducted on several fish and invertebrate species where contract mechanisms would incur an intolerable delay.

25. (U) 7610 - 7709. Acute toxicity values for 14 munitions-related compounds were generated using Daphnia magna, fathead minnows, bluegills, and rainbow trout. In addition, existing munitions contracts were supplemented by providing information on HMX solubility, and by developing methodology and then measuring NG concentrations in bioassay test waters.

*Available to contractors upon originator's approval.

DD FORM 1 MAR 68 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A, 1 NOV 65 AND 1498-1, 1 MAR 68 (FOR ARMY USE) ARE OBSOLETE.
* U.S. GPO: 1974—540-843/8691

DETAIL SHEET

TITLE: Screening of Munitions-Related Chemicals for Acute Toxicity to Aquatic Organisms

WORK UNIT NO: 123

AGENCY ACCESSION: DAOB 6188

PROGRESS

Aquatic toxicity screening studies of 14 "minor" munitions pollutants have been completed. Screening tests included 96-hour static acute tests with fathead minnows and/or bluegill sunfish, and 48-hour static acute tests with Daphnia magna. Using the USEPA aquatic toxicity criteria of LC/EC 50's equal to or below 1 mg/l as being highly toxic, only tertyl proved to be highly toxic.

Solubility studies were conducted on HMX. Results indicate that HMX was less soluble than originally thought. According to the new data the three highest HMX levels tested in the aquatic toxicity test should have equal saturated solutions with approximately 6.6 mg/l in solution. However, toxicity data demonstrated a dose-rate response among the three questioned levels, indicating a discrepancy between toxicity results and solubility test results. These findings will be discussed in the final report on HMX toxicity.

Test waters from nitroglycerine (NG) bioassays were tested for NG concentrations. Original data were reported as nominal concentrations and new results allowed data to be presented as actual concentrations. Results indicated that actual concentrations were approximately twice as great as reported nominal concentrations. This information has been supplied to the contractor who performed the original research to be incorporated into the final report.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
				DA 0B 6228	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
	A. NEW	U	U	NA	NL	☒ YES ☐ NO	A. WORK UNIT

10. NO. CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62720A	3E762720A835	00	124
b. CONTRIBUTING				
XXXXXXXX	CARDS 114f			

11. TITLE (Precede with Security Classification Code)*

(U) Problem Definition Study on Disposal of Army Hazardous Wastes

12. SCIENTIFIC AND TECHNOLOGICAL AREAS* 007800 Hygiene and Sanitation; 003300 Chemical Engineering; 005900 Environmental Biology

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7710	7809	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 77	0.0	00
FISCAL YEAR CURRENT 78	0.9	30

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

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TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* Warner, M.C.

TELEPHONE: (301) 663-2036; AUTOVON 343-2036

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Meier, E.P.

NAME: POC:DA

21. GENERAL USE

Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Hazardous Materials; (U) Pollution; (U) Aquatic Toxicology; (U) Toxicity; (U) Disposal; (U) Hazardous Wastes; (U) Solid Wastes

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To identify existing and potential Army problems in disposal of hazardous wastes; to determine if acceptable disposal methods are available for these wastes; and, to identify those problems that require R&D effort to produce acceptable disposal methods. Recent state and federal legislation has placed stringent controls on the disposal of hazardous wastes. Federal law places responsibility for safe disposal of these wastes on the owner. In many cases there are no acceptable disposal methods and the Army's wastes must be stored until a safe disposal method can be found. The Army must identify its problems in this area and develop safe disposal methods when necessary.

24. (U) A problem definition study will be performed to identify Army problems in disposal of hazardous wastes. This information will be obtained by contacting the environmental offices of the major commands, the Defense Logistics Agency and other commands as they are identified. DARCOM Program Managers will be contacted to determine what planning is required for potential waste problems that may occur as a result of development, manufacture, use, and disposal of new materials. Site visits, to obtain detailed information, will be made to those installations where problems in hazardous waste disposal have been identified. Current disposal procedures will be reviewed (literature review, on-going R&D, legislation, etc.) and requirements for R&D will be identified.

25. (U) None.

*Available to contractors upon originator's approval.

DD FORM 1 MAR 68 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A, 1 NOV 65 AND 1498-1, 1 MAR 68 (FOR ARMY USE) ARE OBSOLETE. ★ U.S. GPO: 1974—540-843/8691

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION* DA 0B 6229	2. DATE OF SUMMARY* 77 10 07	REPORT CONTROL SYMBOL DD-DR&E(AR)636	
3. DATE PREV SUM'RY	4. KIND OF SUMMARY A. NEW	5. SUMMARY SCTY* U	6. WORK SECURITY* U	7. REGRADING* NA	8a. DISP'N INSTR'N NL	8b. SPECIFIC DATA-CONTRACTOR ACCESS ☒ YES ☐ NO	9. LEVEL OF SUM A. WORK UNIT

10. NO. CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62720A	3E762720A835	00	125
b. CONTRIBUTING				
XXXXXXXXX	CARDS 114f			

11. TITLE (Precede with Security Classification Code)*

(U) Evaluation of Chemical Fixation Processes for Disposal of Army Hazardous Wastes

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

007800 Hygiene and Sanitation; 012700 Physical Chemistry

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7710	7810	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 77	0.0	00
FISCAL YEAR CURRENT 78	1.0	30

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

NAME: Dettor, C.M., COL

TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* Kulkarni, R.K.

TELEPHONE: (301) 663-2332; AUTOVON 343-2332

SOCIAL SECURITY ACCOUNT NUMBER:

21. GENERAL USE

Foreign Intelligence Not Applicable

ASSOCIATE INVESTIGATORS

NAME: Meier, E.P.

NAME: Rosencrance, A.B. POC:DA

22. KEYWORDS (Precede EACH with Security Classification Code)

(U) Waste Disposal; (U) Hazardous Wastes; (U) Chemical Fixation; (U) Heavy Metals

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To evaluate the use of chemical fixation methods for the treatment and disposal of Army hazardous wastes. Sludges from Army electroplating and paint removal operations, excess laboratory chemicals, and excess inorganic pesticides are examples of Army hazardous wastes that require treatment to fix toxic inorganic components prior to disposal. The variety and composition of wastes generated are unique to Army operations and require evaluation on a case by case basis.

24. (U) A problem definition study and a laboratory evaluation will be performed. The problem definition will (1) identify Army hazardous wastes that might be treated by chemical fixation; (2) review the literature and on-going R&D to determine what fixation methods are available; and, (3) develop an approach to aid in selecting the best fixation method for Army hazardous wastes as they are identified. The laboratory study will evaluate the success of the use of a chemical fixation process for treatment of sludge wastes of Tobyhanna Army Depot. Elutriate tests will be performed to determine if this treatment was effective in meeting state environmental standards for disposal of the fixed material in a sanitary landfill.

25. (U) None.

*Available to contractors upon originator's approval.

DD FORM 1 MAR 68 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A, 1 NOV 65 AND 1498-1, 1 MAR 68 (FOR ARMY USE) ARE OBSOLETE. * U.S. GPO: 1974-546-043/8691

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA 0B 6181	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISB'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
76 10 01	K. COMPLETION	U	U	NA	NL	[X] YES [ ] NO	A. WORK UNIT

10. NO. CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62720A	3E762720A835	00	126
b. CONTRIBUTING				
XXXXXXXXX	CARDS 114f			

11. TITLE (Precede with Security Classification Code)* (U) Characterization of a Vapor Compression Distillation Unit for Potential Application to MUST

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*
003300 Chemical Engineering; 003400 Civil Engineering; 016700 Thermodynamics

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7606	7709	DA	C. In-House

17. CONTRACT/GRANT
a. DATES/EFFECTIVE: EXPIRATION:
b. NUMBER:*
c. TYPE: d. AMOUNT:
e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 77	0.4	10
FISCAL YEAR CURRENT 78	0.0	00

19. RESPONSIBLE DOD ORGANIZATION
NAME:* US Army Medical Bioengineering Research & Development Laboratory
ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL
NAME: Dettor, C.M., COL
TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION
NAME:* US Army Medical Bioengineering Research & Development Laboratory
ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)
NAME:* McCarthy, J.J.
TELEPHONE: (301) 663-7207; AUTOVON 343-7207
SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS
NAME: Chyrek, R.A.
NAME: POC:DA

21. GENERAL USE
Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Wastewater Treatment; (U) Distillation; (U) Wastewater Reuse; (U) Solids Concentration

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To obtain necessary data needed to characterize performance of the vapor compression distillation unit and to evaluate its treatment of certain wastewaters. Compression distillation is a possible alternative or addition to wastewater treatment processes currently proposed for reuse of MUST type hospital wastewater. This work unit will provide data to make a decision about its incorporation into the MUST wastewater treatment train.

24. (U) The distillation unit will be characterized by first defining its performance for some predetermined (or standard) water. Once baseline performance has been established, the unit will be stressed by adding increasing amounts of dissolved solids in the form of both non-hardness and hardness producing constituents to the feed water. Performance will be measured and monitored. Finally, some synthetic military wastewaters and concentrates from MUST treatment processes will be fed to it for additional testing of its treatability characteristics.

25. (U) 7604 - 7709. Precluding foaming problems, the Vapor Compression Distillation Unit can produce a laundry water distillate containing a total solids content averaging 15 mg/l, a chemical oxygen demand averaging 50 mg/l and a total organic content averaging 10 mg/l when recycle liquor solids content is as high as 5. Considerable mechanical and material deficiencies were encountered during testing. Many were corrected over the 432 hr test period, but it was felt some major design changes were necessary before the unit could reliably treat laundry wastewater. Major ones were a reliable and adequate compressor motor and adequate controls. Testing was terminated due to excess solids carryover from foaming. Details of this study were published in USAMBRDL TR 77-10, "Evaluation of a Vapor Compression Distillation Unit for Laundry Wastewater Reuse," September 1977.

*Available to contractors upon originator's approval.

DD FORM 1 MAR 68 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A, 1 NOV 68 AND 1498-1, 1 MAR 68 (FOR ARMY USE) ARE OBSOLETE.
* U.S. GPO: 1974—540-843/8691

DETAIL SHEET

TITLE: Characterization of a Vapor Compression Distillation Unit for Potential Application to MUST

WORK UNIT NO: 126

AGENCY ACCESSION: DAOB 6181

PROGRESS

A nominal 6 gallon per hour vapor compression distillation unit (VCDU) fabricated by Chemtric, Inc., of Rosemont, Illinois, was evaluated. The unit was designed to distill wastewater using less than 300 watt-hours of energy per gallon of recovered water. The object of the evaluation was to measure product water quality and energy use rates, and to monitor operation and maintenance over an extended run period. Operational time of 432 hours was accumulated on the VCDU over a 16-week period using laundry wastewater as the feed.

Compared to tap water, product water quality from the laundry wastewater feed was lower in turbidity, total solids, and conductivity, but higher in total organic carbon and chemical oxygen demand. Energy use was very dependent on the operation of the storage tank heater. If all make up heat could be supplied solely by vapor compression, energy use was minimum. If it was necessary to add the storage tank heater, energy use was maximum. Actual operation used the storage tank heater part of the time and energy use averaged 655 watt-hours per gallon of water produced.

Energy use rates for the VCDU were high because of intermittent operation of the unit, lack of adequate operator controls, and maintenance problems. Maintenance problems proved to be a source of considerable difficulty and several modifications had to be made in order to get the VCDU to operate satisfactorily. Varying water levels and convection currents in the sump and storage tanks contributed to less than nominal heat transfer conditions which also affected energy use requirements.

Operation of the VCDU was terminated when foam from the concentrated wastewater began to carry-over into the product water despite a foam entrainment control medium packed inside the processor tank. Product water quality deteriorated rapidly once foam carry-over became consistent.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION* DA 0B 6230	2. DATE OF SUMMARY* 77 10 07	REPORT CONTROL SYMBOL DD-DR&E(AR)636	
3. DATE PREV SUM'RY	4. KIND OF SUMMARY A. NEW	5. SUMMARY SCTY* U	6. WORK SECURITY* U	7. REGRADING* NA	8a. DISP'N INSTR'N NL	8b. SPECIFIC DATA - CONTRACTOR ACCESS ☒ YES ☐ NO	9. LEVEL OF SUM A. WORK UNIT

10. NO. CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62720A	3E762720A835	00	127
b. CONTRIBUTING				
XXXXXXXX	CARDS 114f			

11. TITLE (Precede with Security Classification Code)* (U) Evaluation of Filtration Techniques for Disposal of Operational Wastes from Army Pest Management Programs

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*
007800 Hygiene and Sanitation; 003300 Chemical Engineering; 003400 Civil Engineering

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7710	7809	DA	C. In-House

17. CONTRACT/GRANT
a. DATES/EFFECTIVE: EXPIRATION:
b. NUMBER:*
c. TYPE: d. AMOUNT:
e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 77	0.0	00
FISCAL YEAR CURRENT 78	1.5	49

19. RESPONSIBLE DOD ORGANIZATION
NAME:* US Army Medical Bioengineering Research & Development Laboratory
ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL
NAME: Dettor, C.M., COL
TELEPHONE: (301) 663-2434; AUTOVON 343-2434

21. GENERAL USE
Foreign Intelligence Not Applicable

20. PERFORMING ORGANIZATION
NAME:* US Army Medical Bioengineering Research & Development Laboratory
ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)
NAME:* Meier, E.P.
TELEPHONE: (301) 663-2036; AUTOVON 343-2036
SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS
NAME: Dennis, W.H.
NAME: POC:DA

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Hazardous Wastes; (U) Filtration; (U) Pesticide Wastes; (U) Waste Treatment; (U) Water Treatment

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To evaluate the use of filtration/adsorption techniques for treatment of wastes generated by Army installation pest control facilities. Stringent EPA pesticide regulations have led to the need for improved pest control facilities at Army installations with strict control on the disposal of the pesticide wastes generated. Federal law places responsibility for safe disposal on the user. The variety of pesticides used and the large volume of wastes generated make the requirement for this effort in pesticide waste treatment unique to DA.

24. (U) A filtration/adsorption system will be assembled using commercially available or easily prepared filtration equipment. The system will include a pre-filter for removal of solids and non-aqueous material (oils, emulsifiers, etc.) and a charcoal filter for removal of pesticides and other organic contaminants. The system will be tested against a recipe waste (mixture of known pesticide concentrations) and authentic wastes from Army pest control facilities. Aquatic bioassay before and after treatment will be used to determine the overall effectiveness of the system for removing toxic wastes. Analysis of the effluent water for selected pesticides will be used to determine if the system will produce water suitable for reuse at the facility or discharge into a sanitary sewer.

25. (U) None.

*Available to contractors upon originator's approval.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION* DA 0B 6182	2. DATE OF SUMMARY* 77 10 01		REPORT CONTROL SYMBOL DD-DR&E(AR)636
3. DATE PREV SUM'RY 76 10 01	4. KIND OF SUMMARY D. CHANGE	5. SUMMARY SCTY* U	6. WORK SECURITY* U	7. REGRADING* NA	8a. DISB'N INSTR'N NL	8b. SPECIFIC DATA-CONTRACTOR ACCESS ☒ YES ☐ NO	9. LEVEL OF SUM A. WORK UNIT
10. NO. CODES:*	PROGRAM ELEMENT	PROJECT NUMBER		TASK AREA NUMBER	WORK UNIT NUMBER		
a. PRIMARY	62720A	3E762720A835		00	128		
b. CONTRIBUTING							
XXXXXXXXX	CARDS 114f						

11. TITLE (Precede with Security Classification Code)*

(U) Pilot Plant Development for Wastewater Reuse for Field Army

12. SCIENTIFIC AND TECHNOLOGICAL AREAS* 003300 Chemical Engineering; 003400 Civil Engineering; 004200 Computers; 007800 Hygiene and Sanitation

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7404	CONT	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 77	2.4	99
FISCAL YEAR CURRENT 78	3.0	119

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

NAME: Dettor, C.M., COL

TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* Peterman, B.W.

TELEPHONE: (301) 663-7207; AUTOVON 343-7207

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Cowen, W.F.

NAME: McCarthy, J.J. POC:DA

21. GENERAL USE

Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Drinking Water; (U) Wastewater Treatment; (U) Wastewater Reuse; (U) Water Quality; (U) Water Analysis; (U) Ozonation; (U) Reverse Osmosis

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) Define and characterize unit processes for a treatment system to provide (a) treatment for discharge or (b) non-consumptive reuse of certain wastewaters generated in a field hospital.

24. (U) Various unit processes to include ultrafiltration, microfiltration, reverse osmosis, ozonation and carbon adsorption will be evaluated to select a system capable of providing treatment of operating room, clinical laboratory and X-ray wastewaters to discharge and/or reuse quality. Within this process evaluation will be an assessment of the practicality of treatment of each of the wastes based on the complexity of the treatment system required. In addition to process selection the development of advanced control techniques for the processes being considered are being investigated. Initial development will be concerned with constructing simulation models and identification of control requirements for the processes.

25. (U) 7610 - 7709. Construction of the pilot plant facility is essentially completed with only minor modifications, made necessary by changes in the project, remaining to be completed. The processes have been put through an initial operation period with clean water for familiarization and break-in.

*Available to contractors upon originator's approval.

DD FORM 1 MAR 68 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A, 1 NOV 65 AND 1498-1, 1 MAR 68 (FOR ARMY USE) ARE OBSOLETE. * U.S. GPO: 1974—540-843/8691

DETAIL SHEET

TITLE: Pilot Plant Development for Wastewater Reuse for Field Army

WORK UNIT NO: 128

AGENCY ACCESSION: DAOB 6182

PROGRESS

The construction of the pilot plant facility was completed. Available unit processes are ultrafiltration, microfiltration, tubular and hollow fiber reverse osmosis, ozone oxidation, ion exchange, carbon adsorption and depth filtration. In addition to the unit processes, a distributed mini computer system was installed in the pilot plant for collection of information from the numerous sensors within the pilot plant. The computer system will also be utilized to establish control techniques and strategies for the pilot plant operation. Modification to the original objectives of this program have necessitated a redirection of the pilot plant effort. Selection of the wastewaters to be studied during FY78 was limited to the wastes that would be unique to a field medical treatment facility. Their wastewaters are those from the operating room complex, X-ray processing, and chemical laboratory.

The study of the treatment of brackish and fresh waters with depth filtration, carbon adsorption and ion exchange, which was initiated during FY77, was terminated as a result of the previously mentioned redirection.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION* DA OB 6937	2. DATE OF SUMMARY* 77 10 01	REPORT CONTROL SYMBOL DD-DR&E(AR)636
3. DATE PREV SUM'RY 76 10 01	4. KIND OF SUMMARY D. CHANGE	5. SUMMARY SCTY* U	6. WORK SECURITY* U	7. REGRADING* NA	8a. DISP'N INSTR'N NL	8b. SPECIFIC DATA-CONTRACTOR ACCESS ☒ YES ☐ NO	9. LEVEL OF SUM A. WORK UNIT

10. NO. CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62720A	3E762720A835	00	130
b. CONTRIBUTING				
XXXXXXXXX	CARDS 114f			

11. TITLE (Precede with Security Classification Code)* (U) Characterization of Reclaimed Wastewater for Development of Field Army Reuse Standards and Criteria

12. SCIENTIFIC AND TECHNOLOGICAL AREAS* 007800 Hygiene and Sanitation; 003400 Civil Engineering

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7311	CONT	DA	C. In-House

17. CONTRACT/GRANT
a. DATES/EFFECTIVE: EXPIRATION:
b. NUMBER:*
c. TYPE: d. AMOUNT:
e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 77	1.1	32
FISCAL YEAR CURRENT 78	1.6	71

19. RESPONSIBLE DOD ORGANIZATION
NAME:* US Army Medical Bioengineering Research & Development Laboratory
ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL
NAME: Dettor, C.M., COL
TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION
NAME:* US Army Medical Bioengineering Research & Development Laboratory
ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)
NAME:* Cowen, W.F.
TELEPHONE: (301) 663-2036; AUTOVON 343-2036
SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS
NAME: Cooper, W.J.
NAME: POC:DA

21. GENERAL USE
Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Sanitary Engineering; (U) Recycle; (U) Wastewater Treatment; (U) Water Quality; (U) Water Analysis

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To provide water analyses in support of contracts and in-house research on the development of standards and criteria for wastewater reuse by field Army units.

24. (U) Use automated colorimetric methods for analysis of common water quality parameters. Develop in-house capability for measuring trace concentrations of organics in reuse waters by fluorimetric and gas chromatographic methods.

25. (U) 7610 - 7709. Capability to measure trace levels of stable end products of ozonation has been accomplished for formaldehyde, glyoxylic acid, formic acid, and acetic acid. Tests of an improved method for oxalic acid are still in progress. The capability to measure trihalomethane compounds resulting from chlorination has been established.

*Available to contractors upon originator's approval.

DD FORM 1 MAR 68 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A, 1 NOV 65 AND 1498-1, 1 MAR 68 (FOR ARMY USE) ARE OBSOLETE. * U.S. GPO: 1974—540-843/8691

DETAIL SHEET

TITLE: Characterization of Reclaimed Wastewater for Development of Field Army Reuse Standards and Criteria

WORK UNIT NO: 130

AGENCY ACCESSION: DAOB 6937

PROGRESS

Attempts to determine low levels of oxalic acid in ozonated wastewaters by gas chromatography (GC) of the dipentafluorobenzyl ester were not successful, due to the poor nucleophilicity of the oxalate anion and to artifacts produced by hydrolysis of pentafluorobenzyl bromide, which interfered with the GC peak of the oxalate ester. However, the procedure was found to work well for monocarboxylic acids (formic and acetic acids) and by utilizing a Hall electrolytic conductivity detector (halogen mode) detection limits of at least 0.5 mg/l have been observed for these acids.

Glyoxal, methyl glyoxal and dimethyl glyoxal were found to react readily with o-phenylenediamine in the presence of bisulfite ion, using a procedure developed under contract with Dr. P.K. Kuo at the University of Illinois. Detection of the quinoxaline reaction products using GC with a Hall detector (N mode) was hindered by the presence of large amounts of unreacted o-phenylenediamine. Using GC, with flame ionization detector, minimum detectable levels were determined to be about 0.2 mg/l for the glyoxals.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION* DA 0A 6941	2. DATE OF SUMMARY* 77 10 01	REPORT CONTROL SYMBOL DD-DR&E(AR)636
3. DATE PREV SUM'RY 76 10 01	4. KIND OF SUMMARY H. TERMINATION	5. SUMMARY SCTY* U	6. WORK SECURITY* U	7. REGRADING* NA	8a. DISP'N INSTR'N NL	8b. SPECIFIC DATA-CONTRACTOR ACCESS ☒ YES ☐ NO	9. LEVEL OF SUM A. WORK UNIT

10. NO. CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62720A	3E762720A835	00	131
b. CONTRIBUTING				
XXXXXXXXXX	CARDS 114f			

11. TITLE (Precede with Security Classification Code)* (U) Detection of Enteric Viruses in Water and Reclaimed Wastewater Intended for Army Field Use

12. SCIENTIFIC AND TECHNOLOGICAL AREAS* 008700 Laboratories, Test Facilities and Test Equipment; 005900 Environmental Biology; 007800 Hygiene and Sanitation

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7205	7912	DA	C. In-House

17. CONTRACT/GRANT
a. DATES/EFFECTIVE: EXPIRATION:
b. NUMBER:*
c. TYPE: d. AMOUNT:
e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 77	1.5	43
FISCAL YEAR CURRENT 78	0.0	00

19. RESPONSIBLE DOD ORGANIZATION
NAME:* US Army Medical Bioengineering Research & Development Laboratory
ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL
NAME: Dettor, C.M., COL
TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION
NAME:* US Army Medical Bioengineering Research & Development Laboratory
ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)
NAME:* Schaub, S.A.
TELEPHONE: (301) 663-2036; AUTOVON 343-2036
SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS
NAME: Taylor, G.W.
NAME: POC:DA

21. GENERAL USE
Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Virus; (U) Virology, Analytical Procedures; (U) Sampling; (U) Concentrations; (U) Monitoring

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To develop a final (ultimate) concentration procedure for the quantitative recovery of low levels of enteric virus from potable and reuse waters. Methodology must be compatible with virus assay techniques and maintain virus in a viable state. The research is necessary to provide the Army with capability to monitor water supplies and provide a research tool for evaluation of virus removal capabilities of potable and reuse waters and wastewater treatment technologies.

24. (U) Various physical/chemical virus concentration techniques, such as hollow fiber and thin channel ultrafiltration, Al(OH)3 and low pH precipitation, polyethylene glycol hydroextraction, and two-phase aqueous polymers separation techniques will be compared for their capabilities to reduce volumes of several liters of virus eluent to an ultimate volume of less than 5 mililiters with a high virus recovery efficiency.

25. (U) 7610 - 7709. Beef extract and glycine-EDTA-serum virus eluents have been identified as suitable candidates for reconcentration techniques. Preliminary reconcentration studies with thin channel ultrafiltration and low pH organic flocculation techniques indicate that they have merit for further evaluation because of high efficiency of concentration and virus recovery. Funding for this effort under 6.27.20.A 3E762720A835 has been terminated. Efforts will be continued at this Laboratory under 6.11.01.A 3A161101A91C 00 012.

*Available to contractors upon originator's approval.

DETAIL SHEET

TITLE: Detection of Enteric Viruses in Water and Reclaimed Wastewater Intended for Army Field Use

WORK UNIT: 131

AGENCY ACCESSION: DAOA 6941

PROGRESS

A field comparison of the intermediate-scale, bentonite virus adsorption-concentration technique against a larger, commercially-produced virus concentration device (Carborundum Aquella Concentrator) was completed at a USEPA study site in Vineland, NJ. Duplicate wastewater and groundwater samples were taken with each device. Analysis of samples for plaque-forming viruses was performed at USAMBRDL using BGM and HeLa cell cultures. The bentonite system generally was able to recover a higher percentage of naturally-occurring virus per liter sampled. Although there were wide variations in sampling efficiencies with both devices, the average collection efficiencies from the site were lower than previously observed.

Scale-up studies of the bentonite virus absorption technique, evaluating 10-inch cartridge-type filters and prefilters to select candidates for field testing, neared completion. These filters have been evaluated for their capacity to concentrate bentonite-absorbed enterovirus from large volumes of tap water at a flow rate of 1-2 gallons per minute. Four honeycomb type filters, 3 pleated prefilter types, and 7 combination-type ("sandwich") pleated filters have been tested. In general, 60-70 gallons of water can be filtered before significant breakthrough of turbidity (bentonite) and virus occurs. Good recovery of the virus from the various filters was achieved by flushing the filters with 5 volumes of either 5 percent beef extract or glycine-EDTA-serum eluents, followed by mild sonication of the filter tubes. Total recoveries of 50-68 percent of the seeded poliovirus were achieved using these techniques with 375- to 750-fold volume reductions.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION* DA 0A 6943	2. DATE OF SUMMARY* 77 10 01	REPORT CONTROL SYMBOL DD-DR&E(AR)636
3. DATE PREV SUM'RY 76 10 01	4. KIND OF SUMMARY D. CHANGE	5. SUMMARY SCTY* U	6. WORK SECURITY* U	7. REGRADING* NA	8a. DISP'N INSTR'N NL	8b. SPECIFIC DATA-CONTRACTOR ACCESS ☒ YES ☐ NO	9. LEVEL OF SUM A. WORK UNIT

10. NO. CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62720A	3E762720A835	00	133
b. CONTRIBUTING				
XXXXXXXXX	CARDS 114f			

11. TITLE (Precede with Security Classification Code)* (U) Development of Improved Field Test Procedures for Determining Chemical Disinfection Residuals in Aqueous Solutions

12. SCIENTIFIC AND TECHNOLOGICAL AREAS* 007800 Hygiene and Sanitation; 008700 Laboratories, Test Facilities and Test Equipment

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7205	7809	DA	C. In-House

17. CONTRACT/GRANT
a. DATES/EFFECTIVE: EXPIRATION:
b. NUMBER:*
c. TYPE: d. AMOUNT:
e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR	PRECEDING 77	0.4	21
	CURRENT 78	1.2	50

19. RESPONSIBLE DOD ORGANIZATION
NAME:* US Army Medical Bioengineering Research & Development Laboratory
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NAME:* Meier, E.P.
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SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS
NAME: Cooper, W.J.
NAME: Kulkarni, R.K. POC:DA

21. GENERAL USE
Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Analysis; (U) Syringaldazine; (U) Chlorine Dioxide; (U) Bromine; (U) Chlorine; (U) Iodine; (U) Combined Chlorine; (U) Test Kit

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To modify the FACTS procedures for use in determination of combined available chlorine, ozone, bromine and chlorine dioxide; and to assist USAMERADCOM in the product improvement program for the Army FACTS field test kit for free available chlorine (FAC). The need for an improved test for FAC is uniquely military since military water supplies vary much more widely than civilian water supplies, resulting in a wider spectrum of interferences and a wider range of required chlorine dosages; military equipment must be capable of operating over a wider range of conditions than civilian equipment; and military tests must be simple enough to require a minimum of operator training. Ozone, bromine and chlorine dioxide are potential alternatives to chlorine for use in disinfection of military water supplies. Ozone oxidation is being considered as a unit process for the treatment of medically unique wastes from Army Field Hospitals.

24. (U) The FACTS Procedure will be tested for its ability to determine ozone, combined chlorine, bromine, and chlorine dioxide in water. The stoichiometry of the color reactions will be determined and FACTS procedures will be developed for these compounds.

25. (U) 7610 - 7709. Modifications of the FACTS procedure were developed for the analysis of combined chlorine and ozone. The FACTS procedure is being tested for use in analysis of bromine and iodine. An evaluation of the specificity of the DPD w/glycine method and FACTS method for free available chlorine was completed and a report is in preparation.

*Available to contractors upon originator's approval.

DETAIL SHEET

TITLE: Development of Improved Field Test Procedures for Determining Chemical Disinfection Residuals in Aqueous Solutions

WORK UNIT NO: 133

AGENCY ACCESSION: DAOA 6943

PROGRESS

Studies were initiated to use or modify the FACTS procedure for the analysis of combined chlorine, iodine, bromine, ozone, and chlorine dioxide in water. Modified FACTS methods for total available chlorine, combined available chlorine and ozone were successfully developed. These methods rely on the addition of KI to the test sample prior to analysis. The KI reacts with the sample to produce I_2 which is then determined by the FACTS method. Attempts to produce a method that could differentiate between mono- and dichloramine were unsuccessful; however, the modified method does have a linear response of 0-10 mg/l (as Cl_2) for total available and combined available chlorine. The FACTS procedure does yield a color response upon direct analysis for ozone; however, the color fades rapidly and does not have the intensity required for an acceptable method. The modified FACTS procedure does yield an acceptable response with a linear range of 0-6 mg/l. Direct analysis for iodine and bromine is possible with the FACTS procedure and Beer's law data for these disinfectants are being collected. Attempts to determine the effects of bromamines on the bromine analysis and to produce a FACTS procedure for bromamines have been unsuccessful due to problems in preparing the combined forms of bromine.

An evaluation of the specificity of the DPD-glycine method and the FACTS method for free available chlorine was completed. These procedures were tested against laboratory waters containing mono-, di- or trichloramine and against a diluted wastewater that had been treated with chlorine to various points along the breakpoint curve. The results indicate that the GPD-glycine method was subject to interference from combined chlorine in all cases. The FACTS procedure showed no interference response to any of the samples except those containing trichloramine. The response of the two methods to trichloramine may have been due to low equilibrium concentrations of HOCl that could not be eliminated from the test samples.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION* DA 0A 6945	2. DATE OF SUMMARY* 77 10 01		REPORT CONTROL SYMBOL DD-DR&E(AR)636
3. DATE PREV SUM'RY 76 10 01	4. KIND OF SUMMARY D. CHANGE	5. SUMMARY SCTY* U	6. WORK SECURITY* U	7. REGRADING* NA	8a. DISP'N INSTR'N NL	8b. SPECIFIC DATA-CONTRACTOR ACCESS ☒ YES ☐ NO	9. LEVEL OF SUM A. WORK UNIT

10. NO. CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62720A	3E762720A835	00	135
b. CONTRIBUTING				
XXXXXXXXX	CARDS 114f			

11. TITLE (Precede with Security Classification Code)* (U) Development and Evaluation of Methods for the Chemical Disposal of Military Standard Pesticides

12. SCIENTIFIC AND TECHNOLOGICAL AREAS* 007800 Hygiene and Sanitation; 012100 Organic Chemistry; 003300 Chemical Engineering

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7205	CONT	DA	In-House

17. CONTRACT/GRANT
a. DATES/EFFECTIVE: EXPIRATION:
b. NUMBER:*
c. TYPE: d. AMOUNT:
e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR	PRECEDING 77	4.7	160
	CURRENT 78	2.4	84

19. RESPONSIBLE DOD ORGANIZATION
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ASSOCIATE INVESTIGATORS
NAME: Warner, M.C.
NAME: Meier, E.P. POC:DA

21. GENERAL USE
Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Pesticides; (U) Solid Waste; (U) Ultimate Disposal; (U) Pesticide Wastes; (U) Pesticide Chemistry

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To develop chemical methods for the detoxification of military standard organophosphorus and carbamate pesticide formulations and to evaluate the practicality and health and environmental effects of disposal of the detoxified material. The magnitude of the pest management program conducted annually by DA and the large stock of pesticide wastes generated by this program make the requirement for this effort in pesticide disposal unique to DA. Federal Law places responsibility for safe disposal on the User -- DA.

24. (U) Laboratory studies will be conducted to develop chemical methods for complete degradation of the pesticide in each formulation. Health and environmental effects of disposal of the resulting reaction mixtures will be evaluated using data from the literature for known or suspected toxicity of the reaction products to mammals and aquatic biota and by conducting aquatic bioassays on the reaction mixtures and isolated reaction products.

25. (U) 7610 - 7709. USAMBRDL TR 7611, "Chemical Degradation of Military Standard Formulations of Organophosphate and Carbamate Pesticides. I. Chemical Hydrolysis of Diazinon," November 1976, was published. Bioassay studies indicated that the reduction in diazinon concentration after acid hydrolysis was not paralleled by a reduction in toxicity. This "residual" toxicity may be due to a toxic impurity, O,O,O,O-tetraethyldithiopyrophosphate (sulfotep), that was identified in all diazinon formulations. The impurity is resistant to acid hydrolysis and was found in all reaction mixtures. A report on the chemistry of the Clorox degradation of diazinon is in preparation. The Clorox system does degrade diazinon and sulfotep; however, the reaction yields such products as trichloroacetic acid and chloroform. Bioassay data indicate that this system will detoxify technical standard diazinon.

DETAIL SHEET

TITLE: Development and Evaluation of Methods for the Chemical Disposal of Military Standard Pesticides

WORK UNIT NO: 135

AGENCY ACCESSION: DAOA 6945

PROGRESS

Technical Report 7611, "Chemical Degradation of Military Standard Formulations of Organophosphate and Carbamate Pesticides. I. Chemical Hydrolysis of Diazinon," was published. This report presents the progress of the study on the acid hydrolysis of diazinon up to October 1976. Aquatic bioassay data indicated that the reduction in toxicity of diazinon formulations after strong acid hydrolysis did not parallel the reduction in diazinon concentration. Careful analysis of the reaction mixtures showed the presence of several organophosphorus compounds. These compounds were also observed as impurities in the unreacted diazinon formulations. One of the impurities (~0.5%) has been identified as 0,0,0,0-tetraethyl dithiopyrophosphate, sulfotep. The acute oral LD_{50} of sulfotep to rats has been reported as 5 mg/kg, 30-120-fold more toxic than diazinon. Preliminary data show that sulfotep is stable to acid hydrolysis. Bioassay studies with diazinon and sulfotep were completed. The data indicate that sulfotep is much more toxic than diazinon to fish and invertebrates. Sulfotep was found to be 75, 73, 54 and 7 times more toxic to rainbow trout, bluegill, fathead minnows, and daphnia; respectively, than diazinon. Preliminary indications are that the residual toxicity in the diazinon acid hydrolysis reaction mixtures is related to the sulfotep concentration. Blood chemistry studies with rainbow trout indicate that acid hydrolysis does reduce, but not eliminate, the cholinesterase inhibition due to diazinon pesticide formulations. This is consistent with the residual concentration of sulfotep (a cholinesterase inhibitor) observed in the acid hydrolysis reaction mixtures. Three military and five commercial diazinon formulations were analyzed. Sulfotep was observed at a concentration of 0.25 to 0.8% (relative to the diazinon concentration) in each formulation. The results indicate that sulfotep is a common impurity in all diazinon formulations. Because of the higher stability and toxicity of sulfotep, there is some concern that repeated use of diazinon formulations containing this impurity could result in an unanticipated hazard to health and environment. The Environmental Protection Agency has been informed of these results and a note is being prepared for publication in the open literature. Analysis of a soil extract from a wash area in a pesticide treatment facility did indicate the presence of sulfotep. However, its concentration relative to the diazinon concentration in the soil extract was no higher than observed

in the formulations previously tested. Thus, sulfotep does occur in areas treated with diazinon; but, there is no indication that it is being concentrated in these areas. A literature search is being performed to assist in evaluating the health and environmental impact of the sulfotep impurity.

A preliminary study on the basic hydrolysis of malathion (EC) showed that 1% of this formulation in water is hydrolyzed by 0.25-0.50 M NaOH with a half-life of 2.8 minutes. Higher concentrations of NaOH, or addition of NaCl, slowed the rate of hydrolysis. Bioassay of the reaction mixture is underway.

Bioassay studies with dursban/HOCl reaction mixtures indicate a dramatic reduction in dursban toxicity after treatment with HOCl. This would suggest that the HOCl chemical system is a method of choice for chemical degradation of dursban. However, the products of this reaction have been shown to be trichloroacetic acid and chloroform. The environmental significance of disposal of these products is being evaluated. Additional bioassay studies are planned to correlate reaction time with reduction in toxicity. Studies are planned to determine the rate of dursban degradation as a function of pH.

Three final products of the reaction of Clorox® with diazinon were positively identified as acetic, isobutyric and trichloroacetic acids. Attempts to perform a mass balance on this reaction were not successful because of the difficulty in separating and quantifying acetic and trichloroacetic acids. The Clorox® treatment showed no toxicity reduction for fathead minnows, a 30-fold reduction for bluegill sunfish and >3000-fold reduction for daphnia. The toxicity of the Clorox® reaction mixture may be due to reaction of hypochlorite with the formulation components other than the pesticide. This hypothesis will be tested by comparison of the reaction products obtained from Clorox® with the diazinon EC formulation, and with technical standard diazinon. A technical report on the degradation of diazinon by Clorox® is in preparation.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA 0A 6946	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
76 10 01	H. TERMINATION	U	U	NA	NL	[X] YES [ ] NO	A. WORK UNIT

10. NO. CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62720A	3E762720A835	00	136
b. CONTRIBUTING				
XXXXXXXXX	CARDS 114f			

11. TITLE (Precede with Security Classification Code)* (U) Evaluation of Health and Environmental Effects of Land Application of Wastewater at Military Installations

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*
007800 Hygiene and Sanitation; 003400 Civil Engineering

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7205	7709	DA	C. In-House

17. CONTRACT/GRANT
a. DATES/EFFECTIVE: EXPIRATION:
b. NUMBER:*
c. TYPE: d. AMOUNT:
e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 77	1.3	51
FISCAL YEAR CURRENT 78	0.0	00

19. RESPONSIBLE DOD ORGANIZATION
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NAME: POC:DA

21. GENERAL USE
Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Land Application; (U) Ultimate Disposal; (U) Air Water Interaction; (U) Wastewater Treatment

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To develop and apply quantitative methods of sampling airborne pathogenic viruses and bacteria arising from treated sewage applied by spray irrigation; and to provide microbiological evaluation of land application of wastewater by slow and rapid infiltration and overland flow. Under the requirements of the National Environmental Policy Act, the Army Corps of Engineers requires data from this research to prepare environmental impact statements for existing and planned land application systems.

24. (U) High flow air samplers and aerosolizers will be used to determine sensitivity of assay and to refine techniques for quantitative enumeration of microbes. The disposition and half-lives of the microbes suspended in sewage treated to varying degrees will be determined. Field studies of microbial aerosols produced during spray irrigation will be conducted.

25. (U) 7610 - 7709. Funding for this effort under 6.27.20.A 3E762720A835 has been terminated. Efforts will be continued under a different project number to be identified later. Technical reports on aerobiology studies at Deer Creek, Ohio, and Fort Huachuca, Arizona, when completed, will be reported in an update of this form.

*Available to contractors upon originator's approval.

DD FORM 1 MAR 68 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A, 1 NOV 65 AND 1498-1, 1 MAR 68 (FOR ARMY USE) ARE OBSOLETE.

DETAIL SHEET

TITLE: Evaluation of Health and Environmental Effects of Land Application of Wastewater at Military Installations

WORK UNIT NO: 136

AGENCY ACCESSION: DAOA 6946

PROGRESS

Tests of the effect of sampler-to-sampler variability on estimates of aerosol strength were made for Andersen viable-type air samplers. Samplers were positioned side-by-side within the laboratory aerosol chamber to collect samples of bacterial aerosols (standard plate count) generated from bio-disc sewage effluent. It was determined that sampler variability fell largely within Poisson expectations up to a sample size of about 400 colony-forming-particles/sampler. Variability increased with larger, crowded samples necessitating large positive-hole corrections. Most samples taken in USAMBRDL field studies have not, however, had this level of crowding.

Tests were made of the potential for pre-existing colonies on Andersen sampler agar plates (e.g., inadvertent contaminants) to alter later stage colony counts through the entrainment of viable cells in the airstream during sampling. The effect on observed sample size was found to be either nil or negligible.

The in-house technical report on the second phase, aerobiology/virology study at Ft. Huachuca, AZ underwent final revision and review. Also, the USAMBRDL part of the USAMBRDL/USACRREL technical report on the field effort at Deer Creek Lake, OH, was completed and forwarded to CRREL. Amalgamation of this material with portions prepared at CRREL is in progress.

A contract was let to the H.E. Cramer Co., Salt Lake City, UT for mathematical predictive modeling of microbiological aerosol plume dispersion on the Deer Creek Lake study and for both studies at Ft. Huachuca. Data from all field studies were prepared in suitable form, presented to Cramer, and discussed in a meeting with Cramer personnel.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION* DA 0A 6947	2. DATE OF SUMMARY* 77 10 01	REPORT CONTROL SYMBOL DD-DR&E(AR)636	
3. DATE PREV SUM'RY 76 10 01	4. KIND OF SUMMARY D. CHANGE	5. SUMMARY SCTY* U	6. WORK SECURITY* U	7. REGRADING* NA	8a. DISB'N INSTR'N NL	8b. SPECIFIC DATA-CONTRACTOR ACCESS ☒ YES ☐ NO	9. LEVEL OF SUM A. WORK UNIT
10. NO. CODES:*	PROGRAM ELEMENT	PROJECT NUMBER		TASK AREA NUMBER	WORK UNIT NUMBER		
a. PRIMARY	62720A	3E762720A835		00	137		
b. CONTRIBUTING							
XXXXXXXXX	CARDS 114f						

11. TITLE (Precede with Security Classification Code)* (U) Development and Evaluation of Criteria for Advanced Wastewater Treatment Processes at Military Installations

12. SCIENTIFIC AND TECHNOLOGICAL AREAS* 003300 Chemical Engineering; 003400 Civil Engineering

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7205	CONT	DA	C. In-House

17. CONTRACT/GRANT
a. DATES/EFFECTIVE: EXPIRATION:
b. NUMBER:*
c. TYPE: d. AMOUNT:
e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 77	3.4	113
FISCAL YEAR CURRENT 78	2.9	105

19. RESPONSIBLE DOD ORGANIZATION
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NAME: POC:DA

21. GENERAL USE
Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Sanitary Engineering; (U) Nutrient Removal; (U) Wastewater Treatment; (U) Pollution Abatement

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) Provide Advanced Wastewater Treatment (AWT) technology applicable to US Army wastewater treatment plants so that NPDES permit limitations under PL 92-500 can be met. Design criteria will be established for selected processes with initial emphasis on phosphorus and nitrogen removal procedures. Nutrient removal studies for biological systems have been directed primarily toward the activated sludge system. Most Army wastewater treatment plants are trickling filters; therefore, nutrient removal research will be oriented primarily toward trickling filter systems. In addition, selected Army industrial waste discharges will be evaluated to ascertain both (1) the removal of pollutants from the wastewater, and (2) the effect of those pollutants on the operation of the wastewater treatment plant.

24. (U) Pilot scale studies will be conducted on selected AWT processes and problems. Emphasis will be placed on upgrading existing facilities, rather than attempting to develop processes and procedures for totally new treatment plants. The goal will be to satisfy NPDES permit limitations for designated pollutants, primarily phosphorus and nitrogen, as opposed to attempting to obtain design criteria for extremely low pollutant levels. Laboratory and bench scale studies will be conducted where appropriate in support of the pilot scale studies.

25. (U) 7610 - 7709. Interim draft reports of the results of phosphorus and nitrogen removal studies have been prepared. A literature review on phosphorus removal has been published; USAMBRDL Technical Report 7706, "A Review of Phosphorus Removal Technology," May 1977.

*Available to contractors upon originator's approval.

DETAIL SHEET

TITLE: Development and Evaluation of Criteria for Advanced Wastewater Treatment Processes at Military Installations

WORK UNIT NO: 137

AGENCY ACCESSION: DAOA 6947

PROGRESS

Phosphorus removal studies have been terminated. The studies showed that phosphorus is effectively insolubilized at pH 9.5; trickling filter performance is not adversely affected by the elevated pH; pH adjustment by lime addition is simple and effective; and flocculant aid(s) are necessary for solid-liquid separation of insolubilized phosphorus. Data has been provided and coordination maintained with the US Army Construction Engineering Research Laboratory (CERL), Champaign, IL. CERL has prepared plans for a demonstration project based on USAMBRDL pilot work. A literature review on phosphorus removal has been published, USAMBRDL Technical Report 7706, "A Review of Phosphorus Removal Technology," May 1977.

Some nitrogen removal studies using the rotating biological contactor (RBC) have been completed. The RBC was used as a tertiary process following a trickling filter. Hydraulic loadings of 1.0, 2.0, 3.0 and 4.0 gpd/sq ft have been tested. A hydraulic loading of 3.0 gpd/sq ft was tested (1) without settling between the trickling filter and RBC, and (2) with adjusted pH. Results of these nitrogen removal studies have been provided to the Savannah (Georgia) District Engineer's Office, where the data was used by the Hazen and Sawyer Engineering firm for the Fort Bragg (North Carolina) sewage treatment plant upgrade.

Pilot plant operation in support of research has been continuous and without substantial problems. A Technicon AutoAnalyzer was ordered for use in phosphorus and nitrogen analyses. Support from CERL consisted of one person full time plus visits by other CERL personnel and the loan of a digester for total Kjeldahl nitrogen analysis.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION* DA 0A 6949	2. DATE OF SUMMARY* 77 10 01		REPORT CONTROL SYMBOL DD-DR&E(AR)636
3. DATE PREV SUM'RY 76 10 01	4. KIND OF SUMMARY D. CHANGE	5. SUMMARY SCTY* U	6. WORK SECURITY* U	7. REGRADING* NA	8a. DISB'N INSTR'N NL	8b. SPECIFIC DATA-CONTRACTOR ACCESS ☒ YES ☐ NO	9. LEVEL OF SUM A. WORK UNIT

10. NO. /CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62720A	3E762720A835	00	139
b. CONTRIBUTING				
XXXXXXXXX	CARDS 114f			

11. TITLE (Precede with Security Classification Code)* (U) Methods Development for the Characterization and Analysis of Low Level Military Pollutants

12. SCIENTIFIC AND TECHNOLOGICAL AREAS* 007800 Hygiene and Sanitation; 008000 Industrial Processes; 012100 Organic Chemistry

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7307	CONT	DA	C. In-House

17. CONTRACT/GRANT
a. DATES/EFFECTIVE: EXPIRATION:
b. NUMBER:*
c. TYPE: d. AMOUNT:
e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR	PRECEDING 77	0.9	31
	CURRENT 78	0.7	39

19. RESPONSIBLE DOD ORGANIZATION
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SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS
NAME:
NAME:

21. GENERAL USE
Foreign Intelligence Not Applicable

POC:DA

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Military Unique Pollutants; (U) Analysis of Pollutants; (U) Identification of Pollutants; (U) Pesticides

23. TECHNICAL OBJECTIVE.* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To develop methods for the analysis of recognized militarily relevant low-level pollutants and pesticides and to characterize and analyze previously undefined pollutants arising from military munitions manufacture and pesticide operations. These methods would be used by USAEHA and other OTSG operational elements and munitions plant operators to survey or monitor specific pollutant discharges.

24. (U) Methods will be developed for the routine determination of selected low-level pollutants in water or soil. Pollutant by-products and breakdown products in water, air or soil will be isolated, characterized, and quantified. Where necessary, sensitive methods will be devised to detect them at significant concentrations.

25. (U) 7610 - 7609. The development of a sensitive automated method for the analysis of nitrocellulose (NC) in water was completed. The automated system utilized a Technicon AutoAnalyzer II coupled with two AutoAnalyzer I dialyzers. The procedure consists of the formation of nitrite and nitrate by base hydrolysis of the nitrate ester (NC). The evolved nitrite and nitrate is quantitated by means of a modified Gries method for nitrite. Interfering anions are removed by dialysis. The method is capable of detecting 500 micrograms/l of nitrocellulose suspended in water. The analysis of the carbamate pesticides carbaryl and propoxur and their breakdown products 1-naphthol and isoproxyphenol was initiated. This analytical procedure is designed to detect these compounds, by high pressure liquid chromatography in soil, at the 0.01 mg/kg (ppm) level. After completion of a literature review, work has proceeded to establish soil extraction methods and separation techniques for the four compounds. Work is in progress to establish the conditions necessary to obtain the desired sensitivity.

Available to contractors upon originator's approval.

DETAIL SHEET

TITLE: Methods Development for the Characterization and Analysis of Low Level Military Pollutants

WORK UNIT NO: 139

AGENCY ACCESSION: DAOA 6949

PROGRESS

The development of a sensitive automated method for the analysis of nitrocellulose (NC) in water was completed. The automated system utilized a Technicon AutoAnalyzer II coupled with two AutoAnalyzer I dialyzers. The procedure consists of the formation of nitrite and nitrate by base hydrolysis of the nitrate ester (NC). The evolved nitrite and nitrate is quantitated by means of a modified Gries method for nitrite. Interfering anions are removed by dialysis. The method is capable of detecting 500 µg/l of nitrocellulose suspended in water. A final technical report on this effort is being prepared.

The analysis of the N-methyl-carbamic acid ester pesticides carbaryl (1-naphthyl-N-methylcarbamate) and propoxur (2-isopropoxyphenyl-N-methyl carbamate) and their respective chemical/biological transformation products 1-naphthol and 2-isopropoxyphenol was initiated. The objective of the research is to develop a sensitive, (0.01 ppm), direct high pressure liquid chromatography (HPLC) analytical procedure for the four compounds in soil. After completion of a literature review, the successful extraction, separation and quantitation of carbaryl, 1-naphthol and 2-isopropoxyphenol has been accomplished by means of the HPLC. Attempts to accomplish the same for propoxur have proven to be unsuccessful. However, by use of a gas chromatograph (GC) equipped with a flame ionization detector, propoxur has been quantitated. Neither the HPLC nor the GC method has been able to detect the four compounds at the desired level. Work is in progress to establish the conditions necessary to obtain the desired sensitivity and increase the extraction efficiency.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA 0B 6936	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
76 10 01	D. CHANGE	U	U	NA	NL	[X] YES [ ] NO	A. WORK UNIT

10. NO. CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62720A	3E762720A835	00	140
b. CONTRIBUTING				
XXXXXXXXX	CARDS 114f			

11. TITLE (Precede with Security Classification Code)*

(U) Evaluation of Disinfection Criteria for Water Intended for Army Field Use

12. SCIENTIFIC AND TECHNOLOGICAL AREAS* 007800 Hygiene and Sanitation; 005900 Environmental Biology; 003400 Civil Engineering

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7307	7910	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR	PRECEDING 77	1.4	51
	CURRENT 78	3.1	110

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

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TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

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NAME:* Schaub, S.A.

TELEPHONE: (301) 663-2036; AUTOVON 343-2036

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Kenyon, K.F.

NAME: Taylor, G.W. POC:DA

21. GENERAL USE

Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Bacteriology; (U) Virology; (U) Infectious Disease; (U) Chlorination; (U) Water, drinking

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To evaluate US Army free available chlorine (FAC), disinfection criteria for fixed installation and field water supplies. The requirement for safe water supplies worldwide, under extreme chemical, microbiological and physical conditions makes this problem military unique. Pathogenic organisms must be eliminated from the treated waters to provide assurance that the waters will not cause infectious disease.

24. (U) Literature on chlorine disinfection will be reviewed to determine if previous inability to distinguish FAC from other forms of available chlorine may have overestimated current military requirements. Species of FAC at various temperatures and pH will be examined for their capability to disinfect typical fecal-borne bacteria, viruses and protozoa in various waters over a standard 30 minute contact period. Actual field and fixed installation treated potable waters from various raw water sources will be evaluated to determine if any interference in rates of disinfection occur.

25. (U) 7610 - 7709. Disinfection kinetics of E. coli, Pseudomonas fluorescens, f2 coliphage, poliovirus I and Rhodotorla rubra were reduced in that order at a temperature of 6 C and pH 5, 7, and 9. Use of 250 mg/l Ca to simulate water hardness did not interfere with FAC disinfection at low temperature or a range of pH. Polio virus was observed to have some resistance to chlorine disinfection at pH's when FAC was less than 1 mg/l. Studies revealed that virus specific aggregation was not responsible for this resistance. Utilizing probability theory to explain mechanisms of virus disinfection, it was determined that at pH 7 and 10 only a single chlorine atom bound to f2 coliphage was required for inactivation. Redox reactions between f2 and aqueous chlorine are more prominent at pH 7 and 9 than at lower pH. Disinfection mechanisms work is nearing completion.

*Available to contractors upon originator's approval.

DETAIL SHEET

TITLE: Evaluation of Disinfection Criteria for Water Intended for Army Field Use

WORK UNIT NO: 140

AGENCY ACCESSION: DAOB 6936

PROGRESS

Studies of the disinfection capabilities of various levels of free available chlorine (FAC) at various pH levels at 6°C were completed. Escherichia coli 11229, Pseudomonas fluorescens, f_2 coliphage, poliovirus I (vaccine), and Rhodotorula rubra were utilized for baseline testing.

Disinfection studies were performed utilizing FAC levels of 0.1, 0.25, 0.5, 1.0, 2.0, 3.5, and 5.0 mg/l in buffered demand-free water at pH 5, 7, and 9. Frequent sampling times were chosen to yield accurate data describing a 99.99% inactivation of the test organisms.

The following results for each test organism indicate the least amount of FAC that was required to inactivate 99.99% of the test organisms within 30 min or less. E. coli required 0.1 mg/l FAC at pH 5 and 7 for 30 and 60 sec, respectively, and 0.25 mg/l FAC at pH 9 for 30 min. For P. fluorescens a 0.1 mg/l concentration of FAC was needed for 30 min at pH 9. At pH 5 FAC at 0.1 mg/l required only 60 sec to achieve the same inactivation level. The f_2 coliphage required 0.1 mg/l FAC at pH 5 for 10 min, 0.25 mg/l at pH 7 for 30 min, and 0.5 mg/l at pH 9 for 20 min. Poliovirus I took 0.1 mg/l FAC at pH 5 for 30 min, 0.5 mg/l at pH 7 for 4 min, and 1.0 mg/l at pH 9 for 10 min. R. rubra required 1.0 mg/l FAC at pH 5 for 20 min and 1.0 mg/l at pH 7 for 30 min. No disinfection was observed for R. rubra at pH 9.

The disinfection kinetic curve for Poliovirus I at pH 5 exhibited an anomalous period of resistance at levels of 2 mg/l FAC or less, the duration of the resistant shoulders increasing with decreasing chlorine levels. Virus from pH 5 buffer alone and from several sampling points on the shoulder in a pH 5 solution with 0.5 mg/l FAC was analyzed by sucrose density gradients for the presence of virus aggregates. Results indicate that aggregates account for <0.1% of the original virus input and were not responsible for the shoulder.

Various common water components found in water supplies are being evaluated for their ability to increase microbial resistance FAC.

E. coli 11229 and f_2 coliphage were tested in buffered water containing 250 mg/l Ca^{++} at 6°C at FAC levels of 1.0 mg/l and less. No chlorine demand was found, and disinfection kinetics were similar to those found for buffered waters without Ca^{++}. An exception to this was that at pH 9 the disinfection rates for f_2 virus were nearly halved, compared to its rates without Ca^{++}.

A questionnaire was prepared soliciting guidance from over 40 internationally known experts in water disinfection and waterborne disease concerning selection of organisms for future study in FAC criteria development. Responses on selection of organisms of worldwide concern have been good. In general, the responses reveal greatest interest in the testing of enteric viruses and bacteria, and a few waterborne protozoans and parasites.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION* DA OB 6199	2. DATE OF SUMMARY* 77 10 01	REPORT CONTROL SYMBOL DD-DR&E(AR)636
3. DATE PREV SUM'RY 77 01 31	4. KIND OF SUMMARY D. CHANGE	5. SUMMARY SCTY* U	6. WORK SECURITY* U	7. REGRADING* NA	8a. DISP'N INSTR'N NL	8b. SPECIFIC DATA-CONTRACTOR ACCESS ☒ YES ☐ NO	9. LEVEL OF SUM A. WORK UNIT

10. NO. CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62720A	3E762720A835	00	141
b. CONTRIBUTING				
XXXXXXXXX	CARDS 114f			

11. TITLE (Precede with Security Classification Code)*

(U) Development of Criteria for Wastewater Reuse Standards

12. SCIENTIFIC AND TECHNOLOGICAL AREAS* 007800 Hygiene and Sanitation; 009800 Medical and Hospital Equipment; 016800 Toxicology

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7701	8201	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 77	0.5	20
FISCAL YEAR CURRENT 78	0.5	19

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

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20. PERFORMING ORGANIZATION

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SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Cowen, W.F.

NAME: POC:DA

21. GENERAL USE

Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code)

(U) Wastewater; (U) Water Quality Standards; (U) Toxicity; (U) Wastewater Reuse

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To study health effects associated with renovation and reuse of wastewater in both potable and non-potable military applications, and to develop criteria upon which standards of quality for such renovated waters can be based.

24. (U) Identify the known or predictable components of wastewaters generated at military installations where water reuse may be required: fixed installations in remote or arid areas or mobile facilities such as military field hospitals and construction sites. Review the literature concerning acute and long-term health effects of ingestion of the identified components in potable water and the ocular and dermal effects in the case of nonpotable body contact applications such as laundry, bathing and recreational uses. Document the available knowledge, identify areas in which the necessary information is lacking, and recommend specific studies to obtain that information. Maximum use will be made of existing standards, rationales and health effects data, and the recommended criteria will be based upon the uses of the renovated wastewaters, the duration of exposure, the population exposed, and the military mission involved, which may cause more emphasis to be placed upon short-term or semi-acute effects than upon chronic ones. Advice and recommendations will be sought from the National Academy of Sciences and coordination will be maintained with interested government agencies and professional organizations.

25. (U) 7701 - 7709. A subcommittee of the National Academy of Sciences Committee on Military Environmental Research was formed to review the Army's reuse water quality criteria program and has held its first meeting.

*Available to contractors upon originator's approval.

DD FORM 1 MAR 68 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A, 1 NOV 68 AND 1498-1, 1 MAR 68 (FOR ARMY USE) ARE OBSOLETE

* U.S. GPO: 1974—540-843/8691

DETAIL SHEET

TITLE: Development of Criteria for Wastewater Reuse Standards

WORK UNIT NO: 141

AGENCY ACCESSION: DAOB 6199

PROGRESS

A subcommittee on Water Reuse of the National Academy of Sciences Committee on Military Environmental Research has been formed, and a joint presentation of Army and Navy requirements for reuse water quality criteria was made before that subcommittee by representatives of USAMBRDL and the Naval Civil Engineering Laboratory (NCEL). Site visits have been made and coordination meetings have been held with those responsible for reuse water quality criteria development or promulgation of standards within the National Aeronautics and Space Administration, the US Environmental Protection Agency, the Office of Water Research and Technology, and NCEL.

Literature searches have been performed on methods for separating, concentrating and analyzing trace contaminants in water and hard copies of reports and journal copies have been obtained. This information will be studied for methods applicable to preparation of concentrates for toxicity studies. Paperwork has been completed and submitted for solicitation of a contract effort to develop a management plan for the Army-Navy water reuse project.

COMBAT MEDICAL MATERIEL

(Military Medical Materiel, Exploratory Development)

3S762778A838

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA OB 6206	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
76 12 15	D. CHANGE	U	U	NA	NL	[X] YES [ ] NO	A. WORK UNIT

10. NO./CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62778A	3S762778A838	00	001
b. CONTRIBUTING				
XXXXXXXXX	CARDS 114f			

11. TITLE (Precede with Security Classification Code)*

(U) Sink Unit, Surgical, Modification of

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

009800 Medical and Hospital Equipment; 002400 Bioengineering

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7612	7812	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR	PRECEDING 77	0.2	06
	CURRENT 78	0.3	15

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

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20. PERFORMING ORGANIZATION

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NAME:* Cranford, H.B.

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SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Patzer, N.H.

NAME: POC:DA

21. GENERAL USE

Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code)

(U) Surgical Sink; (U) Scrub; (U) Field Equipment; (U) Surgical Scrub

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To modify standard surgical sink unit (NSN 6545-00-935-4056) replacing components no longer available from commercial sources.

24. (U) Investigate and evaluate new components for direct substitution with minimum modification to sink.

25. (U) 7612 - 7709. Sink unit was modified to accept a commercially available replacement valve. The scope of the task was enlarged to perform an Engineering Study to identify problem areas and recommend solutions.

*Available to contractors upon originator's approval.

SINK UNIT, SURGICAL, MODIFICATION OF
3S762778A838.00.001

Detail Sheet

1. BACKGROUND.

The sink unit, surgical scrub, and utensil, hospital field (NSN 6545-00-935-4056) is a lightweight self contained unit for performing surgical scrubbing and washing of instruments and utensils in the field. The unit is capable of delivering either electrically heated water or unheated water as desired.

The original object of this task was to investigate the feasibility of modifying the water control valve (PN 120). The valve is no longer manufactured by Jamesbury Corporation. A replacement valve was installed on the unit and successfully tested. The USAMBRDL drawing No. 10271 was changed and copies forwarded. The master copy was forwarded to DPSC.

As a result of several field trips, it became apparent problems existed with the sink. Consequently, USAMRDC requested an engineering study be performed to identify problem areas and recommend possible solutions.

2. CONCLUSIONS.

The replacement valve was incorporated into the design with appropriate documentation changes permitting DPSC to procure sink units.

3. RECOMMENDATIONS.

It is recommended the engineering study be completed prior to further modifications to the sink.

4. REFERENCES.

a. Letter, subject: Sink Unit, Surgical, Modification of, Task No. 838.00.001, SGRD-SDM, undated, Department of the Army, USAMRDC, Washington, D.C.

b. MIL-S-37321 (DSA DM), Military Specifications, Sink Unit, Surgical Scrub and Utensil, Hospital, Field.

c. Letter, subject: Modification of Water Control Valve, Sink Unit, Surgical Scrub, Field, NSN 6545-00-935-4056, SGRD-SDM, undated, Department of the Army, USAMRDC, Washington, D.C.

d. Letter, SGRD-UBE-G, 15 June 1977, subject: Modification of Water Control Valve, Sink Unit, Surgical Scrub, Field, NSN 6545-00-935-4056, Task No. A838.00.001.

e. Letter, SGRD-UBE-G, 2 August 1977, subject: Modification of Water Control Valve, Sink Unit, Surgical Scrub, Field, NSN 6545-00-935-4056, Task No. A838.00.001

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION* DA 0B 6179	2. DATE OF SUMMARY* 77 10 01	REPORT CONTROL SYMBOL DD-DR&E(AR)636
3. DATE PREV SUM'RY 76 10 01	4. KIND OF SUMMARY D. CHANGE	5. SUMMARY SCTY* U	6. WORK SECURITY* U	7. REGRADING* NA	8a. DISP'N INSTR'N NL	8b. SPECIFIC DATA-CONTRACTOR ACCESS ☒ YES ☐ NO	9. LEVEL OF SUM A. WORK UNIT

10. NO./CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62778A	3S762778A838	00	002
XXXXXXXXX	62110A	3A162110A816	00	002
XXXXXXXXX	CARDS 114f			

11. TITLE (Precede with Security Classification Code)*
(U) Decontaminator-Washer-Rinser; Engineering Evaluation of

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*
010100 Microbiology; 009800 Medical and Hospital Equipment

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7607	7803	DA	C. In-House

17. CONTRACT/GRANT
a. DATES/EFFECTIVE: EXPIRATION:
b. NUMBER:*
c. TYPE: d. AMOUNT:
e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 77	0.0	00
FISCAL YEAR CURRENT 78	0.2	10

19. RESPONSIBLE DOD ORGANIZATION
NAME:* US Army Medical Bioengineering Research & Development Laboratory
ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL
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TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION
NAME:* US Army Medical Bioengineering Research & Development Laboratory
ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)
NAME:* Prensky, W.C.
TELEPHONE: (301) 663-7277; AUTOVON 343-7277
SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS
NAME: Hodge, J.W.
NAME: Patzer, N.H. POC:DA

21. GENERAL USE
Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Washing Equipment; (U) Hospital Equipment; (U) Decontamination Equipment; (U) Engineering Evaluation; (U) Rinsing Equipment;

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)
(U) Medical Equipment

23. (U) To conduct an Engineering Evaluation of a proposed piece of medical equipment, which has the capability to decontaminate, wash and rinse instruments and utensils.

To identify the most efficient and microbiologically safe method of decontamination and processing instruments and utensils in the sterile preparation area of the military field hospital.

24. (U) Prepare a test protocol and after approval conduct the evaluation.

25. (U) 7610 - 7709. Breadboard DWR has been delivered to USAMBRDL. Volume I of Contractor's Final Report received. Clinical Evaluation Report received and reviewed. Engineering Evaluation initiated.

*Available to contractors upon originator's approval.

DD FORM 1 MAR 68 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A, 1 NOV 65 AND 1498-1, 1 MAR 68 (FOR ARMY USE) ARE OBSOLETE. * U.S. GPO: 1974—546-843/8691

DECONTAMINATOR-WASHER-RINSER, ENGINEERING EVALUATION OF

3S762778A838.00.002

Detail Sheet

1. BACKGROUND.

This task was established on 4 August 1976. A breadboard of this equipment is presently at USAMBRDL after completing clinical evaluation at Kimbrough Army Hospital, Fort Meade, Maryland in June 1976.

2. CONCLUSIONS.

Engineering evaluation have not yet commenced.

3. RECOMMENDATIONS.

The breadboard DWR is a large, heavy unit weighing over 1,000 pounds which makes it a doubtful field item. Presently, these functions are accomplished manually. It is believed that mechanical means are superior and since it is common commercial practice to separate these functions into smaller units, military equipment should be developed along these lines.

4. REFERENCES.

a. Letter, SGRD-UBE-G, dated 4 August 1976, subject: Field Sterilization Study: Establishment of New Work Units.

b. Report No. W8422, dated 15 August 1976, by Castle Company, titled: A Program to Design, Develop, Test and Evaluate Feasibility Prototype Models of Preparation/Sterilization Equipment to Process Medical/Surgical Supplies, Final Report, Phase II, Volume I, Technical Investigation.

c. Letter, SGRD-SDM, dated 15 November 1976, subject: Clinical Evaluation of Prototypes for Preparation and Sterilization Equipment.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA 0B 6180	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8A. DISB'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
76 10 01	H. TERMINATION	U	U	NA	NL	[X] YES [ ] NO	A. WORK UNIT

10. NO./CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62778A	3S762778A838	00	003
XXXXXXXXX	62110A	3A162110A816	00	003
XXXXXXXXX	CARDS 114f			

11. TITLE (Precede with Security Classification Code)*

(U) Ethylene Oxide and Steam Sterilizer; Engineering Evaluation of

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

010100 Microbiology; 009800 Medical and Hospital Equipment

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7607	7712	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 77	0.1	04
FISCAL YEAR CURRENT 78	0.0	00

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

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RESPONSIBLE INDIVIDUAL

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20. PERFORMING ORGANIZATION

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PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* Prensky, W.C.

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SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Hodge, J.W.

NAME: Patzer, N.H. POC:DA

21. GENERAL USE

Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Sterilizers; (U) Ethylene Oxide; (U) Field Sterilizers; (U) Engineering Evaluation; (U) Field Equipment

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To conduct an Engineering Evaluation of proposed field-type steam and ethylene oxide sterilizers.

To identify the most efficient and microbiologically safe methods/equipment to provide guaranteed sterility of required materials at the user patient level during Army field medical care.

24. (U) Prepare a test protocol and after approval conduct the evaluation.

25. (U) 7610 - 7709. Engineering evaluation completed and report transmitted to SGRD-POM. Advance information received is that the work unit is in process of being terminated as of 1 October 1977 by USAMRDC.

*Available to contractors upon originator's approval.

DD FORM 1 MAR 68 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A, 1 NOV 65 AND 1498-1, 1 MAR 68 (FOR ARMY USE) ARE OBSOLETE. * U.S. GPO: 1974—540-843/88

ETHYLENE OXIDE AND STEAM STERILIZERS, ENGINEERING EVALUATION OF

3S762778A838.00.003

Detail Sheet

1. BACKGROUND.

This task was established on 4 August 1976. Two sets of equipment consisting of an ethylene oxide sterilizer (EOS) and a steam pressure-pulsing, condensing, automatic sterilizer (SVP) with their support units are presently at USAMBRDL. One set was used for clinical evaluation at Kimbrough Army Hospital, Fort Meade, Maryland, ending in June 1976. During preparation for shipment to USAMBRDL, the EOS suffered a structural failure causing substantial damage.

The clinical and engineering evaluations have been completed and reports submitted.

2. CONCLUSIONS.

There were a number of structural inadequacies noted in the prototype units, but the principal concern was that a set of this equipment (with support units) weighs over 1,500 pounds. However, in terms of sterilizing volume per pound of weight, this equipment is more efficient than any large field sterilizer now in service. A suitable reduction in size could produce a superior field system with individual units of more manageable weight.

3. RECOMMENDATIONS.

A new Work Unit should be established for the development of an improved field sterilizer system using concepts developed in this effort. (This current work unit should be closed.)

4. REFERENCES.

a. Letter, SGRD-UBE-G, dated 4 August 1976, subject: Field Sterilization Study; Establishment of New Work Units.

*b. Memorandum for Record, SGRD-UBE-G, dated 7 July 1976, subject: Accidental Damage to Castle Company Ethylene Oxide Sterilizer.

c. Report No. W8422, dated 15 August 1976, by Castle Company titled: A Program to Design, Develop, Test and Evaluate Feasibility Prototype Models of Preparation/Sterilization Equipment to Process Medical/Surgical Supplies, Final Report - Phase II, Volume I, Technical Investigation.

d. Letter, SGRD-SDM, dated 15 November 1976, subject: Clinical Evaluation of Prototypes for Preparation and Sterilization Equipment.

e. Report dated 7 June 1977, subject: Engineering Evaluation of Castle Company CMS Sterilizers.

*Reference b was written prior to the establishment of this work unit, but is considered an important document.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA 0B 6214	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
77 04 29	D. CHANGE	U	U	NA	NL	[X] YES [ ] NO	A. WORK UNIT

10. NO./CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62778A	3S762778A838	00	004
b. CONTRIBUTING				
XXXXXXXXXX	CARDS 114f			

11. TITLE (Precede with Security Classification Code)*

(U) Norwegian Medical Supply Chest/Personnel Heater, Engineering Evaluation of

12. SCIENTIFIC AND TECHNOLOGICAL AREAS* 013300 Protective Equipment; 009800 Medical and Hospital Equipment; 002400 Bioengineering

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7704	7809	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR	PRECEDING 77	0.1	02
	CURRENT 78	0.2	10

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

NAME: Dettor, C.M., COL

TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* Patzer, N.H.

TELEPHONE: (301) 663-7277; AUTOVON 343-7277

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Crampton, K.T.

NAME: POC:DA

21. GENERAL USE

Foreign Intelligence Considered

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Field Chests; (U) Personnel Warmer; (U) Heated Chest; (U) Cold Weather Equipment; (U) Personnel Heater; (U) Environmental Container

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To conduct an engineering evaluation of a heated cold weather supply chest and a personnel heater currently being used by the Norwegian Armed Forces.

24. (U) Prepare an evaluation plan and conduct the tests.

25. (U) 7704 - 7709. Evaluation plans for the subject items have been approved and tests are currently being conducted.

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*Available to contractors upon originator's approval.

DD FORM 1 MAR 68 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A, 1 NOV 65 AND 1498-1, 1 MAR 68 (FOR ARMY USE) ARE OBSOLETE.

* U.S. GPO: 1974—540-843/8691

ENGINEERING EVALUATION OF NORWEGIAN
MEDICAL SUPPLY CHEST/PERSONNEL HEATER
3S762778A838.00.004

Detail Sheet

1. BACKGROUND.

In cooperation with the Norwegian Joint Medical Service (NJMS) the Norwegian Defence Research Establishment has developed a medical stores container for use under winter field conditions. The two cubic foot, lightweight container is equipped with plastic drawers to allow convenient packaging of a 30-40 pound medical stores kit. Two heating systems are incorporated in the container:

a. An electric heating system powered by an external 24 volt DC/AC supply prevents the contents from freezing at ambient temperatures down to -40°C. Power consumption is 1 watt for each °C of inside to outside temperature difference.

b. A heating system based on charcoal combustion, independent of an external power source, is capable of maintaining 20 ± 5°C inside temperature at ambient temperatures down to -50°C. Fuel consumption is approximately one 200 gram charcoal fuel element and two 1.5 volt flashlight batteries, each 24 hours at -30°C ambient temperature.

In addition, the heating system has been repackaged as a small lightweight unit for providing supplementary heat to inactive personnel during cold weather operations (casualties, guards, etc.).

Two heated supply chests and two personnel heaters were supplied to USAMRDC free of charge, for evaluation purposes.

Evaluation plans have been prepared and approved by higher authorities and the items are presently under evaluation by USAMBRDL.

2. CONCLUSIONS.

None.

3. RECOMMENDATIONS.

None.

4. REFERENCES.

a. Norwegian Report, undated, subject: Heat Balance and Heating of Patients on Stretchers by LT. Nils Roabe.

b. Interim Norwegian Report, October 1976, subject: Heated Medical Stores Container for Winter Field Conditions by E. Melvaer.

c. Letter, SGRD-RO-D, 14 April 1977, subject: Norwegian Medical Chests-Personnel Heaters.

d. USAMBRDL Evaluation Plan, March 1977, subject: Norwegian Environmental Protection Container for Medical Supplies.

e. USAMBRDL Evaluation Plan, 20 May 1977, subject: Norwegian Charcoal Personnel Heater.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA 0A 6209	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
76 10 01	D. CHANGE	U	U	NA	NL	☒ YES ☐ NO	A. WORK UNIT

10. NO./CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62778A	3S762778A838	00	005
XXXXXXXXX	62110A	3A062110A816	00	005
XXXXXXXXX	CARDS 114f			

11. TITLE (Precede with Security Classification Code)*

(U) Container, Adjustable, Subsistence Test Weight

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

006500 Food; 007800 Hygiene and Sanitation

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
6711	7803	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE

FISCAL YEAR	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
PRECEDING 77	0.2	07
CURRENT 78	0.1	01

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

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20. PERFORMING ORGANIZATION

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SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Patzer, N.H.

NAME: POC:DA

21. GENERAL USE

Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Frozen Foods; (U) Net Weight; (U) Food Inspection; (U) Food; (U) Container; (U) Weight; (U) Inspection

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To devise a method of determining the net weight of frozen foods such as pork loins, chickens, hams, pork butts, etc., that will permit repacking in the original container. This device will be used by Veterinary Corps personnel in the performance of their assigned mission of monitoring the quality of food procured for Army personnel.

24. (U) Design of a rack that will permit removal of the frozen food, plus repacking without disturbing the orientation of the contents.

25. (U) 7610 - 7709. Fabrication and shipment of prototypes has been completed. Awaiting results of tests from the designated Army veterinary activities.

*Available to contractors upon originator's approval.

DD FORM 1 MAR 68 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A, 1 NOV 65 AND 1498-1, 1 MAR 68 (FOR ARMY USE) ARE OBSOLETE.

* U.S. GPO: 1974—540-843/8691

CONTAINER, ADJUSTABLE, SUBSISTENCE TEST WEIGHT

3S762778A838.00.005

Detail Sheet

1. BACKGROUND.

The purpose of this project is to develop a method of inspecting and determining the net weight of frozen foods which will permit repacking into their original container, without altering the product configuration. The task was initiated by the U.S. Army Medical Service Meat and Drug Hygiene School. Unsatisfactory prototypes were fabricated by a contractor and field tested during 1961. One of the initial prototypes was redesigned by the U.S. Army Medical Equipment Research and Development Laboratory, reference 4a. Subsequent tests of the modified configuration were made in 1971 by the Veterinary Office in Fort Dix, New Jersey, with negative results, reference 4b. Additional testing in 1972 of a slightly different variation of the prototype had similarly negative results.

In 1974 based upon request by the Medical R&D Command, reference 4c, a prototype of the Test Weight Adjustable Container and an especially designed carrying case were sent out with a Plan of Professional Evaluation, reference 4d, for testing. On 13 March 1975, a request, reference 4e, was received by this Laboratory to fabricate one hundred (100) containers. These items were to be shipped to various Army Veterinary activities for their evaluation and use. Minor modifications resulting from the field evaluation reports would be used to optimize the equipment during the manufacturing period. All prototype units have been fabricated and are undergoing tests. Updating of the drawing package to reflect the latest design changes has been completed.

2. CONCLUSIONS.

As a result of the various tests conducted to date, this device has undergone several redesigns and optimization. There is no substantial data yet, however, in support of its adoption to a standard item.

3. RECOMMENDATIONS.

The evaluation reports received from the Veterinary Agencies testing the 100 units be analyzed to corroborate practicality and usefulness of the device.

4. REFERENCES.

a. Evaluation Report, 1 September 1970, Office for Veterinary Activities, Fort Dix, New Jersey.

b. Evaluation Report, 27 July 1971, Office for Veterinary Activities, Fort Dix, New Jersey.

c. Letter, SGRD-SDM, 25 March 1974, subject: Container, Adjustable, Subsistence, Test Weight.

d. Plan of Professional Evaluation, Container Subsistence, Test Weight, 1 May 1974.

e. Letter, SGRD-SDM, 13 March 1975, subject: Container, Adjustable, Subsistence, Test Weight.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION* DA 0A 6237	2. DATE OF SUMMARY* 77 10 01		REPORT CONTROL SYMBOL DD-DR&E(AR)636
3. DATE PREV SUM'RY 76 10 01	4. KIND OF SUMMARY D. CHANGE	5. SUMMARY SCTY* U	6. WORK SECURITY* U	7. REGRADING* NA	8a. DISP'N INSTR'N NL	8b. SPECIFIC DATA - CONTRACTOR ACCESS ☒ YES ☐ NO	9. LEVEL OF SUM A. WORK UNIT

10. NO. /CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62778A	3S762778A838	00	006
XXXXXXXX	62110A	3A162110A816	00	006
XXXXXXXX	CARDS 114f			

11. TITLE (Precede with Security Classification Code)*

(U) Dental Plastic Insert Module

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

009800 Medical and Hospital Equipment; 002400 Bioengineering

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
6910	7909	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR	PRECEDING 77	0.0	00
	CURRENT 78	0.1	10

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

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20. PERFORMING ORGANIZATION

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NAME:* Malek, J.W.

TELEPHONE: (301) 663-7277; AUTOVON 343-7277

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME:

NAME: POC:DA

21. GENERAL USE

Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Dental Portable Equipment; (U) Dental Field Units; (U) Dental Field Sets; (U) Plastic; (U) Module; (U) Field Insert; (U) Field Cabinet

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To develop a plastic insert module which will provide field dental personnel with a modern, mobile piece of equipment.

24. (U) Fabricate universal plastic instrument and equipment modules compatible with Chest, Medical Instrument and Supply Set (MISS) (NSN 6545-00-118-6248) complete with three sizes of interchangeable drawers and a mobile base platform.

25. (U) 7610 - 7709. Trial utilization and compartmentalization is continuing concomitant with trial packing of the dental sets.

*Available to contractors upon originator's approval.

DD, FORM 1 MAR 68 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A, 1 NOV 65 AND 1498-1, 1 MAR 68 (FOR ARMY USE) ARE OBSOLETE.

U.S. GPO: 1974—540-843/8691

DENTAL PLASTIC INSERT MODULE

3S762778A838.00.006

Detail Sheet

1. BACKGROUND.

These modules were intended to replace the current inserts which contain the instruments, medicaments and supplies of the current Dental Equipment Set, General Dentistry, Field; Dental Equipment Set, Dental Hygienist, Field; Dental Equipment Set, Prosthetic Field; Dental Equipment Set, Dental Service Augmentation; and Dental Equipment Set Operating, Field. A fresher and significant aim was to provide instrument and equipment cabinetry that was suitable for use in both field and overseas Garrison Treatment enviroments. Seventy (70) modules were fabricated under contract with the Gilbert Plastics, Inc., between February 1969 and January 1970. They were designed as inserts which would fit into the Chest, MISS, in groups of three. Each module could accommodate either two (2), four (4), or eight (8) inch drawers, for a total accommodation of eight (8) inches. Each group of three modules was supported by a plastic mobile base. Preproduction modules were successfully subjected to Environmental Testing in October 1969. Nine (9) modules and three (3) mobile bases were permanently transferred to the USAF School of Aviation Medicine forUSAF evaluation and disposition.

Three (3) modules and one (1) mobile base were permanently transferred to the Pan American Health Organization of the World Health Organization for use at the University of Zulia in Maracaibo, Venezuela. Six (6) modules and two (2) mobile bases were permanently transferred to the USAH, Asmara, East Africa. The plastic invert modules were subjected to clinical evaluation in February-March 1970 at Fort Sam Houston, Texas, This evaluation indicated general acceptability of the items with minor deficiencies. Exterior retention locks were added in lieu of Velcro retainers, to retain the drawers when laden with instruments and equipment. Stainless steel sterilizer trays were added as replacements for a deleted Bracket Tray assembly. After modification, six (6) modules and two (2) mobile bases contained in Chest, MISS, were shipped to USAREUR in February 1971 for inclusion in a Military Potential Test (MPT) of field dental equipment prototypes. An interim evaluation report of June 1971 indicated general acceptability and suitability of the modules in all treatment environments. The evaluation report indicated that the modules were structurely sound for all intended uses. Three (3) modules are deemed adequate per operator once an optimal packaging of component instrumentation and equipment is complete. In response to the suggestion of the Dental Project Officer, USAMRDC, the casters of the mobile bases to a moveable free-wheeling type was accomplished.

2. CONCLUSIONS.

The plastic insert modules suitable for field military use is technically feasible.

3. RECOMMENDATIONS.

Continue development to compartmentalize the insert drawers to accommodate the individual requirements of field dental sets.

4. REFERENCES.

a. QMDO for Field Dental Equipment, 6 March 1967.

b. Contract DADA17-69-C-9081, Gilbert Plastics, Inc., February 1969.

c. Clinical Evaluation, Fort Sam Houston, Texas, March 1970.

d. Military Potential Test, USAREUR, February-May 1971.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA 0A 6238	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8A. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
76 10 01	D. CHANGE	U	U	NA	NL	[X] YES [ ] NO	A. WORK UNIT

10 NO / CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62778A	3S762778A838	00	007
b. CONTRIBUTING	62110A	3A162110A816	00	007
c. CONTRIBUTING	CARDS 114f			

11 TITLE (Precede with Security Classification Code)*

(U) Dental Operating Set

12 SCIENTIFIC AND TECHNOLOGICAL AREAS*

009800 Medical and Hospital Equipment; 002400 Bioengineering

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
6910	7909	DA	C. In-House

17 CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR	PRECEDING 77	0.0	00
	CURRENT 78	0.3	15

19 RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

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20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* Malek, J.W.

TELEPHONE: (301) 663-7277; AUTOVON 343-7277

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME:

NAME:

21. GENERAL USE

Foreign Intelligence Not Applicable

POC:DA

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Dental Portable Equipment; (U) Dental Field Sets; (U) Dental Sets; (U) Dental Operating Set

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To update and modernize the current Dental Equipment Set, Operating, Field NSN 6545-00-918-0050.

24. (U) Evaluate contents and recommend deletions and/or additions after acceptable review; evaluate packing of components into plastic insert modules being developed under Task 838.00.006, then clinically evaluate the modular concept with reference to revised TOE.

25. (U) 7610 - 7709. Trial packing of selected components is continuing concurrently with receipt of materials and compartmentalization of modules.

*Available to contractors upon originator's approval.

DD FORM 1 MAR 68 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A, 1 NOV 65 AND 1498-1, 1 MAR 68 (FOR ARMY USE) ARE OBSOLETE.

DENTAL OPERATING SET

3S762778A838.00.007

Detail Sheet

1. BACKGROUND.

Concurrent with design and fabrication of Dental Plastic Inserts Modules, effort has been initiated to encase the dental specialty sets in assemblies of plastic modules. The Dental Operating Set was intended to replace the instrument/medicament/supplies portion of the Dental Equipment Set, Operating Field. A component list acceptability is dependent upon the acceptability of the Dental Plastic Insert Modules which are intended to contain them, as well as professional assessment and approval. Various configurations have been made over the years, but a firm solid component list has not been established.

2. CONCLUSIONS.

Interim evaluations by various personnel has indicated that packaging of a Field Dental Operating Set is technically feasible.

3. RECOMMENDATIONS.

Continue feasibility study and trial packaging.

4. REFERENCES.

QMDO for Field Dental Equipment, 6 March 1967.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA 0A 6239	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
76 10 01	D. CHANGE	U	U	NA	NL	[X] YES [ ] NO	A. WORK UNIT

10. NO./CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62778A	3S762778A838	00	008
b. CONTRIBUTING	62110A	3A162110A816	00	008
XXXXXXXXX	CARDS 114f			

11. TITLE (Precede with Security Classification Code)*

(U) Dental Prosthodontic Set

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

009800 Medical and Hospital Equipment; 002400 Bioengineering

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
6910	8009	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 77	0.0	00
FISCAL YEAR CURRENT 78	0.1	10

19. RESPONSIBLE DOD ORGANIZATION

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ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

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TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* Malek, J.W.

TELEPHONE: (301) 663-7277; AUTOVON 343-7277

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME:

NAME:

21. GENERAL USE

Foreign Intelligence Not Applicable

POC:DA

22. KEYWORDS (Precede EACH with Security Classification Code)

(U) Dental Portable Equipment; (U) Dental Field Sets; (U) Prosthetic; (U) Dental Prosthodontic Set

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To update and modernize the current Dental Equipment Set, Prosthetic, Field (FSN 6545-918-4750). To package components for fixed and removable assemblages.

24. (U) Prepare component listings and pack proposed components into the Plastic Insert Modules being developed under Task 838.00.006. Evaluate clinically the modular concept.

25. (U) 7610 - 7709. Trial packing evaluation continuing. Investigation of a self-contained workbench-type module is also continuing.

*Available to contractors upon originator's approval.

DENTAL PROSTHODONTIC SET

3S762778A838.00.008

Detail Sheet

1. BACKGROUND.

Concurrent with design and fabrication of Dental Plastic Insert Module, effort has been initiated to encase dental specialty sets in assemblies of plastic modules. The Dental Prosthodontic Set was intended to provide the Prosthodontist in the field and overseas garrison with a suitable prosthetic capability and replace the current Dental Equipment Set, Prosthetic Field. Acceptability of revised component inventory dependent upon acceptability of Dental Plastic Insert Modules for all parts of the set. Several trial packaging of this set using different component lists have been initiated.

2. CONCLUSIONS.

Interim evaluations of the Dental Plastic Insert Modules indicated suitability for packing of field Dental Equipment. Development of a Dental Prosthodontic Set is technically feasible.

3. RECOMMENDATIONS.

Continue feasibility study and trial packaging of components.

4. REFERENCES.

QMDO for Dental Field Equipment, 6 March 1967.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA OB 6219	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
77 05 31	D. CHANGE	U	U	NA	NL	[X] YES [ ] NO	A. WORK UNIT

10. NO./CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62778A	3S762778A838	00	009
b. CONTRIBUTING				
c. CONTRIBUTING	CARDS 114f			

11. TITLE (Precede with Security Classification Code)*

(U) Tactical Ambulance Adaptation, Feasibility Study of

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

002400 Bioengineering; 009800 Medical and Hospital Equipment

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7705	8209	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 77	0.1	01
FISCAL YEAR CURRENT 78	0.2	10

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

NAME: Dettor, C.M., COL

TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* Cranford, H.B.

TELEPHONE: (301) 663-7277; AUTOVON 343-7277

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Salisbury, L.L.

NAME: POC:DA

21. GENERAL USE

Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code)

(U) Ambulance; (U) Tactical Ambulance; (U) Emergency Medical Vehicle; (U) Medical Transport

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To conduct a feasibility study to improve patient handling and treatment in a tactical ambulance adaptation in preparation for the next procurement program.

24. (U) Initiate a problem definition study to identify the requirements imposed on the total vehicle by the patient treatment necessary, tactical and logistic considerations. The results of this study will be utilized in the design of a prototype compartment.

25. (U) 7705 - 7709. Problem definition study outline has been completed. Resolution of problem areas has been initiated.

*Available to contractors upon originator's approval.

TACTICAL AMBULANCE ADAPTATION, FEASIBILITY STUDY OF

3S762778A838.00.009

Detail Sheet

1. BACKGROUND.

The purpose of the task is to conduct a feasibility study to improve patient handling/treatment in tactical Ambulance adaptation of a commercial 1 1/4 ton truck.

2. CONCLUSIONS.

The feasibility study will provide design data prior to any prototype fabrication and subsequent evaluation.

3. RECOMMENDATIONS.

Complete problem definition study, resolve problem areas, and initiate breadboard design.

4. REFERENCES.

a. Letter, Department of the Army, U.S. Army Medical Research and Development Command, Washington, D.C., SGRD-SDM, dated 9 March 1977, subject: Feasibility Study, Improvement in Patient Handling/Treatment in Tactical Ambulance Adaptation of Commercial 1 1/4 Ton Truck.

b. Memorandum for Record, U.S. Army Medical Bioengineering Research and Development Laboratory, Fort Detrick, Frederick, Maryland, SGRD-UBE-G, dated 5 August 1977.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION* DA 0B 6163	2. DATE OF SUMMARY* 77 10 01	REPORT CONTROL SYMBOL DD-DR&E(AR)636
3. DATE PREV SUM'RY 77 04 29	4. KIND OF SUMMARY H. TERMINATION	5. SUMMARY SCTY* U	6. WORK SECURITY* U	7. REGRADING* NA	8a. DISP'N INSTR'N NL	8b. SPECIFIC DATA-CONTRACTOR ACCESS ☒ YES ☐ NO	9. LEVEL OF SUM A. WORK UNIT

10. NO./CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62778A	3S762778A838	00	009
b. CONTRIBUTING	62110A	3A162110A816	00	009
c. CONTRIBUTING	CARDS 114f			

11. TITLE (Precede with Security Classification Code)*

(U) Pharmacy Engineering Assistance and Prototype Fabrication

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

009800 Medical and Hospital Equipment; 012600 Pharmacology

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7508	7906	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 7T	0.0	00
FISCAL YEAR CURRENT 77	0.0	00

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

NAME: Angel, C.M., COL

TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* Malek, J.W.

TELEPHONE: (301) 663-7277; AUTOVON 343-7277

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: O'Connor, R.J.

NAME: POC:DA

21. GENERAL USE

Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Pharmacy Equipment; (U) Field Equipment; (U) Engineering Support; (U) Medical; (U) Biologicals; (U) Drugs

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To provide support to evaluate evolving new generations of pharmacy prototypes for military field use.

24. (U) Consistent with the current Tables of Organization and Equipment, evaluate new pharmaceutical equipment from an engineering point-of-view.

25. (U) 7610 - 7704. No effort expended as evaluation of new pharmacy equipment prototypes are incorporated into individual projects. Task terminated.

*Available to contractors upon originator's approval.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION* DA 0B 6164	2. DATE OF SUMMARY* 77 10 01		REPORT CONTROL SYMBOL DD-DR&E(AR)636
3. DATE PREV SUM'RY 76 10 01	4. KIND OF SUMMARY D. CHANGE	5. SUMMARY SCTY* U	6. WORK SECURITY* U	7. REGRADING* NA	8a. DISP'N INSTR'N NL	8b. SPECIFIC DATA - CONTRACTOR ACCESS ☒ YES ☐ NO	9. LEVEL OF SUM A. WORK UNIT

10. NO./CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62778A	3S762778A838	00	010
XXXXXXXXX	62110A	3A162110A816	00	010
XXXXXXXXX	CARDS 114f			

11. TITLE (Precede with Security Classification Code)*

(U) Sterilizing Equipment Engineering Assistance and Prototype Fabrication

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

009800 Medical and Hospital Equipment; 010100 Microbiology

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7508	7906	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 77	0.1	02
FISCAL YEAR CURRENT 78	0.1	01

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

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20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

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NAME:* Prensky, W.C.

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SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: O'Connor, R.J.

NAME: POC:DA

21. GENERAL USE

Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Sterilizing; (U) Field Equipment; (U) Medical; (U) Field Sterilization; (U) Field Sterilizers; (U) Portable Sterilizers

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To provide engineering support to evaluate evolving new processing/ sterilizing equipment for military field use.

24. (U) Professionally evaluate new items of sterilizing equipment.

25. (U) 7610 - 7709. Engineering evaluation reports have been submitted on the breadboard models of the Emergency Sterilizer, Ethylene Oxide Sterilizer and the Steam Sterilizer. A contract for 12 prototype Emergency Sterilizers is in progress with delivery expected in October 1977. This is now known as the US Army Hi-Speed Mini-Sterilizer.

*Available to contractors upon originator's approval.

STERILIZING EQUIPMENT ENGINEERING ASISTANCE AND PROTOTYPE FABRICATION

3S762778A838.00.010

Detail Sheet

1. BACKGROUND.

This task was established in August 1975. In June 1970, AMEDD awarded Arthur D. Little, Inc., a Phase I contract to determine feasibility of developing an advanced system for the preparation and sterilization of medical and surgical items. The Castle Company of Rochester, New York, was a principal subcontractor. In 1973, a Phase II contract was awarded to Castle Company to design, build and test the following devices:

a. One Decontaminator-Washer-Rinser (DWR).

b. Two Steam Vacuum Pulse Sterilizers (SVP).

c. Two Ethylene Oxide Sterilizers (EOS).

d. One Emergency Sterilizer.

The prototypes were completed and one set was sent to Kimbrough Army Hospital, Fort Meade, Maryland, for clinical evaluation which was completed in June 1976.

Engineering evaluation was completed on the Emergency Sterilizer and submitted 9 October 1976. A contract was awarded to Castle Company for 12 units of a second design to be delivered in October 1977 and now named, "U.S. Army Hi-Speed, Mini-Sterilizer". Engineering monitoring of this contract has concentrated on the problem of assuring that future quantity production of this item can be ASME Code approved.

Engineering evaluation was completed on the Ethylene Oxide and Steam Vacuum Pulse Sterilizers and a report submitted, 17 June 1977.

Engineering evaluation has not yet commenced on the Decontaminator-Washer-Rinser.

2. CONCLUSIONS.

The Emergency Sterilizer was of generally sound engineering design. A number of comments in regard to structural integrity and high torque required by an operating control, have been addressed in the second prototype design.

The EOS and SVP, with their necessary support equipment, are considered to be too heavy for practical use in field hospitals. However, the evaluation indicated that in terms of their sterilizing volume per pound of weight, they were more efficient than any large unit now in the field. The possibility exists that a moderate size reduction might produce a satisfactory field system.

The DWR has not yet been evaluated, but it seems safe to say that it is entirely too large and heavy for practical use in the field.

3. RECOMMENDATIONS.

Although this work unit has been largely superseded by newer work units for the individual items, it should be continued to serve as a vehicle for supporting generalized work in sterilization.

4. REFERENCES.

a. Letter, SGRD-UBE-G, dated 8 August 1975, subject: Task Establishment for Engineering Support Requirements.

b. Letter, SGRD-SDM, dated 26 May 1976, subject: Field Sterilizer Prototypes.

c. Report of Visit, dated 25 February 1976, subject: Witness Operation of Field Sterilization Equipment.

d. Memorandum for Record, SGRD-UBE-G, dated 7 July 1976, subject: Accidental Damage to Castle Company, Ethylene Oxide Sterilizer.

e. Final Report, Castle Company Report No. W4822, dated 15 August 1976, subject: A Program to Design, Develop, Test and Evaluate Feasibility Prototype Supplies, Final Report, Phase II.

f. Letter, SGRD-UBE-G, dated 19 October 1976, subject: Comments on Castle Company Prototype Emergency Sterilizer.

g. Letter, SGRD-SDM, dated 15 November 1976, subject: Clinical Evaluation of Prototypes Per Preparation and Sterilization Equipment.

h. Report dated 7 June 1977, subject: Engineering Evaluation of Castle Company CMS Sterilizers.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA 0A 6242	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
76 10 01	D. CHANGE	U	U	NA	NL	☒ YES ☐ NO	A. WORK UNIT

10. NO./CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62778A	3S762778A838	00	011
XXXXXXXXX	62110A	3A162110A816	00	011
XXXXXXXXX	CARDS 114f			

11. TITLE (Precede with Security Classification Code)*

(U) Dental Hygienist Set

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

009800 Medical and Hospital Equipment; 007800 Hygiene and Sanitation

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
6910	7909	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 77	0.0	00
FISCAL YEAR CURRENT 78	0.2	10

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

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TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* Malek, J.W.

TELEPHONE: (301) 663-7277; AUTOVON 343-7277

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME:

NAME:

21. GENERAL USE

Foreign Intelligence Not Applicable

POC:DA

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Dental Field Systems; (U) Dental Field Equipment; (U) Hygienist; (U) Dental Hygienist Set

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To modernize the current Dental Hygienist Set (NSN 6545-00-142-8896).

24. (U) Review components and pack components into the Plastic Insert Modules being developed under Task 838.00.006, then clinically evaluate the modular concept.

25. (U) 7610 - 7709. Trial packing and evaluation continuing concurrently with receipt of materials and compartmentalization of modules.

*Available to contractors upon originator's approval.

DD FORM 1 MAR 68 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A, 1 NOV 65 AND 1498-1, 1 MAR 68 (FOR ARMY USE) ARE OBSOLETE.

DENTAL HYGIENIST SET

3S762778A838.00.011

Detail Sheet

1. BACKGROUND.

This task was established to develop a modified Dental Equipment Set, Dental Hygienist, Field and repackaged into an assembly of plastic modules and provide a sophisticated hygiene capability for both field and overseas garrison dental service. Completion of the effort is dependent upon the acceptability of the Dental Plastic Insert Modules. Several trial packagings of this set using different component lists have been initiated.

2. CONCLUSIONS.

Packaging of this set in the Plastic Modules is technically feasible.

3. RECOMMENDATIONS.

Continue development.

4. REFERENCES.

QMDO for Field Dental Equipment, 6 March 1967.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION* DA 0B 6166	2. DATE OF SUMMARY* 77 10 01	REPORT CONTROL SYMBOL DD-DR&E(AR)636
3. DATE PREV SUM'RY 76 10 01	4. KIND OF SUMMARY D. CHANGE	5. SUMMARY SCTY* U	6. WORK SECURITY* U	7. REGRADING* NA	8a. DISB'N INSTR'N NL	8b. SPECIFIC DATA-CONTRACTOR ACCESS [X] YES [ ] NO	9. LEVEL OF SUM A. WORK UNIT

10. NO./CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62778A	3S762778A838	00	012
XXXXXXXXX	62110A	3A162110A816	00	012
XXXXXXXXX	CARDS 114f			

11. TITLE (Precede with Security Classification Code)*

(U) Volume Flow Evaluator, Ultrasonic, Non-Invasive

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

009800 Medical and Hospital Equipment; 002400 Bioengineering

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7510	7912	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 77	0.1	03
FISCAL YEAR CURRENT 78	0.3	15

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

NAME: Dettor, C.M., COL

TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* Salisbury, L.L.

TELEPHONE: (301) 663-7277; AUTOVON 343-7277

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: O'Connor, R.J.

NAME: Stup, J.L. POC:DA

21. GENERAL USE

Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Blood; (U) Flow; (U) Ultrasound; (U) Vascular; (U) Doppler; (U) Non-Invasive

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) A need exists for a non-invasive portable vascular blood flow measuring device and foreign body locator for field military hospital use.

24. (U) Instrumentation will be developed to provide a continuous as well as a frequency modulated scan of blood vessels. The feasibility of storing and processing the data from these scans to provide image and flow information will also be investigated.

25. (U) 7610 - 7709. An integrated circuit function generator and phase locked loop are being used as a signal source, modulator and crystal driver. The receiver consists of amplifier, mixer and filter. The present technique is to observe frequency changes on a spectrum analyzer. Better methods are being investigated.

*Available to contractors upon originator's approval.

VOLUME FLOW EVALUATOR, ULTRASONIC NON-INVASIVE

3S762778A838.00.012

Detail Sheet

1. BACKGROUND.

This project was initiated in 1975 for the purpose of developing an instrument which would provide a non-invasive technique for determining blood vessel diameters. Such a system when used with the already developed ultra sonic doppler flow meter, would permit measurement of blood volume flow and would be of use in the diagnosis of circulatory disorders.

The technique decided on was an adaption of a radar altimeter system used for guided fuzing and aircraft navigation with the carrier shifted from the R.F. range to the ultra sonic range. A frequency modulated ultra sonic signal is progagated through the tissue and an echo is returned from the various discontinuities, within the tissue. This echo is then compared with the transmitted signal and a difference frequency is obtained. This difference frequency is a direct function of the distance, progagation rate and the modulation rate. With known progagation and modulation rates the difference frequency can be directly related to the distance. The resolution of the system is a function of the diviation of the transmitted signal and the modulation rate. These are limited by ambiguity considerations and the ability of the system to respond to rapid changes.

Initially, an attempt was made to modify a commercial ultra sonic flow meter. This was abandoned because of intermodulation band width and non-linear response problems. The system finally developed consists of a phase-lock-loop modulated by a I.C. function generator for the 10 MHZ ultra sonic transmitter. The receiver section consists of a preamplifier, mixer and low-pass filter. Presently, a storage oscilloscope and spectrum analyzer is used as the display.

This unit has functional on a mock-up of the forearm. Problems have been encountered with sensitivity. Optimization of the modulation rate and frequency deviation will be achieved as soon as the sensitivity is increased. Since the inception of this effort, some work has been reported in the Journal of Medical and Biological Engineering, which is similar to the USAMBRDL concept. The group at the University Hospital in Wales, appears to be at about the same stage of development as at this Laboratory.

2. CONCLUSIONS.

The system has potential for adding additional capabilities for determining circulatory problems in the field. It would also be useful for non-Xray location of shrapnel.

3. RECOMMENDATIONS.

It is recommended that efforts in this area continue. In addition to the immediate military applications, a volume flow evaluator would be useful in the civil area.

4. REFERENCES.

a. "Frequency Modulated Ultrasonic Doppler Flowmeter", K. McCarty, J. P. Woodcock, Journal of Medical and Biological Engineering, January 1975.

b. SGRD-SDM to USAMBRDL, 17 September 1975, subject: Non-Invasive Measurement of Blood Flow.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA 0A 6244	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
76 10 01	D. CHANGE	U	U	NA	NL	[X] YES [ ] NO	A. WORK UNIT

10. NO./CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62778A	3S762778A838	00	013
XXXXXXXX	62110A	3A162110A816	00	013
XXXXXXXX	CARDS 114f			

11. TITLE (Precede with Security Classification Code)*

(U) Dental Supplemental Operating Set

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

009800 Medical and Hospital Equipment; 002400 Bioengineering

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
6910	7909	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 77	0.0	00
FISCAL YEAR CURRENT 78	0.2	10

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

NAME: Dettor, C.M., COL

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20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

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NAME:* Malek, J.W.

TELEPHONE: (301) 663-7277; AUTOVON 343-7277

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME:

NAME: POC:DA

21. GENERAL USE

Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Dental Field Set; (U) Resupply; (U) Dental Portable Equipment; (U) Dental Resupply Set

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To develop a resupply set for use in field dental treatment systems.

24. (U) Prepare a component listing and pack components in the Plastic Insert Module being developed under Task 838.00.006, then clinically evaluate the concept.

25. (U) 7610 - 7709. Trial packing is continuing.

*Available to contractors upon originator's approval.

DD FORM 1 MAR 66 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A, 1 NOV 65 AND 1498-1, 1 MAR 66 (FOR ARMY USE) ARE OBSOLETE.

DENTAL SUPPLEMENTAL OPERATING SET

3S762778A838.00.013

Detail Sheet

1. BACKGROUND.

Concurrent with the design and fabrication of Dental Plastic Insert Modules, effort was initiated to encase dental speciality sets in plastic modules. It was intended that a standard resupply set be configured and contained within the plastic modules so as to provide a ready refurnishment of expandable materials. Reconsideration of the necessity for such a pre-packaged moduler resupply element has resulted in a negative conclusion. This task was retained to supplement development effort of the Dental Operating Set.

2. CONCLUSIONS.

None.

3. RECOMMENDATIONS.

None.

4. REFERENCES.

QMDO for Field Dental Equipment, 6 March 1967.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA 0B 6183	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
76 10 01	D. CHANGE	U	U	NA	NL	[X] YES [ ] NO	A. WORK UNIT

10. NO./CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62778A	3S762778A838	00	014
XXXXXXXXX	62110A	3A162110A816	00	014
XXXXXXXXX	CARDS 114f			

11. TITLE (Precede with Security Classification Code)*

(U) Cabinets, MUST, Redesign of

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

009800 Medical and Hospital Equipment; 004400 Containers and Packaging

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7608	7809	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 77	2.2	66
FISCAL YEAR CURRENT 78	0.5	25

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

NAME: Dettor, C.M., COL

TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* Patzer, N.H.

TELEPHONE: (301) 663-7277; AUTOVON 343-7277

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME:

NAME:

21. GENERAL USE

Foreign Intelligence Not Applicable

POC:DA

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Cabinets; (U) Tables; (U) MUST; (U) Field Containers; (U) Combat Support Hospital

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To redesign and develop new cabinets for the MUST Combat Support Hospital to reduce: weight, production costs, and number of different sizes.

24. (U) Design and fabricate new cabinets and evaluate for acceptance.

25. (U) 7610 - 7709. Three sets of cabinets: 18" x 36" x 36"; 18" x 24" x 36"; and 9" x 18" x 36"; each set included lower and upper units, and a 34" x 36" folding table were designed and fabricated. Evaluation of the 18" x 24" x 36" and the 18" x 36" x 36" cabinets has been completed and found to be extremely acceptable. Technical data package requirements have been initiated. Evaluation of the 9" x 18" x 36" cabinets are anticipated for first quarter FY78.

*Available to contractors upon originator's approval.

CABINETS, MUST, REDESIGN OF

3S762778A838.00.014

Detail Sheet

1. BACKGROUND.

Due to high procurement costs for current MUST Cabinets constructed of Honeycomb Panels, a work unit was initiated 26 July 1976, to reduce cost by redesign. The breadboard will be targeted to reduce cabinet cost and weight, reduce the number of different size cabinets for MUST, and provide a design that will allow a broad range of contractors and vendors to bid on construction of new cabinets.

During FY 77, experimental prototypes were fabricated including: Surgical Instrument and Dressing Cabinets, 18" x 36" x 36" lower unit with drawers and upper unit with shelves, 18" x 24" x 36" lower unit with drawers, and upper unit with shelves and door; Surgical Instrument and Surgical Dressing Folding Table, 34 5/8" x 36 1/4"; and Pharmaceutical Storage Cabinets, 9" x 18" x 36" with adjustable shelves and adjustable shelf dividers.

Items above, were evaluated and found to meet functional requirements. Cabinets fabricated from aluminum sheet are at least 20% lighter than current units of Honeycomb Panel construction. Total number of MUST cabinetry items will be reduced from 15 to 8, 47% reduction.

2. CONCLUSIONS.

Evaluation of experimental prototypes, demonstrated weight reduction and ease of handling.

3. RECOMMENDATIONS.

Complete technical data package and forward same for procurement action.

4. REFERENCES.

a. Letter, SGRD-SDM, dated 26 July 1976, subject: MUST Cabinets.

b. D/F, MET&E Diviaion, USAMMA, FSHT, 16 May 1977, subject: Chest Set MUST Prototype.

c. D/F, SGMMA-MD-P, 9 August 1977, subject: Evaluation of 6530-00-NS MUST Cabinets, Upper and Lower Units.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA 0B 6184	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
76 10 01	D. CHANGE	U	U	NA	NL	☒ YES ☐ NO	A. WORK UNIT

10. NO. /CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62778A	3S762778A838	00	015
b. CONTRIBUTING				
XXXXXXXXX	CARDS 114f			

11. TITLE (Precede with Security Classification Code)*

(U) Chair, Dental Operating, Portable

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

008800 Life Support; 009800 Medical and Hospital Equipment

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7610	7809	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR	PRECEDING 77	0.6	20
	CURRENT 78	0.6	30

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering
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RESPONSIBLE INDIVIDUAL
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20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering
ADDRESS:* Research & Development Laboratory
Fort Detrick, Frederick, MD 21701

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NAME:* Malek, J.W.
TELEPHONE: (301) 663-7277; AUTOVON 343-7277
SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS
NAME: Prensky, W.C.
NAME: POC:DA

21. GENERAL USE

Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Dental Chair; (U) Dental Operating; (U) Portable Chair; (U) Field Dental Chair

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To design and fabricate a new portable dental operating chair for Army field use, incorporating light weight materials.

24. (U) Design, fabricate and evaluate a suitable chair.

25. (U) 7610 - 7709. An early prototype which attempted very large weight reductions, proved to be structurally inadequate. Design and development of a satisfactory prototype continues.

CHAIR, DENTAL OPERATING, PORTABLE

3S762778A838.00.015

Detail Sheet

1. BACKGROUND.

This task was established 1 October 1977. It's purpose was to produce prototypes of a new portable dental operating chair for Army field use incorporating weight and cube reductions.

2. CONCLUSIONS.

A first prototype was developed and demonstrated to field personnel whose comments were affirmative. This model did not incorporate light-weight materials but was still approximately 30 pounds lighter than the presently used type-classified chair.

A second prototype is being developed using lighter materials and design which are expected to yield an additional weight reduction. An early attempt required redesign due to structural inadequacies.

3. RECOMMENDATIONS.

Continue Engineering development.

4. REFERENCES.

a. Letter, SGRD-SDD, dated 1 Sep 1976, subject: Establishment of Task; Chair, Dental Operating Portable.

b. Letter, SGRD-VBE-G, dated 15 Oct 1976, subject: Chair, Dental Operating, Portable.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA OB 6172	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
76 10 01	D. CHANGE	U	U	NA	NL	☒ YES ☐ NO	A. WORK UNIT

10. NO./CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62778A	3S762778A838	00	016
~~XXXXXXXXX~~	62110A	3A162110A816	00	016
~~XXXXXXXXX~~	CARDS 114f			

11. TITLE (Precede with Security Classification Code)*

(U) Whole Body Diagnostic X-Ray Scanner

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

003500 Clinical Medicine; 009800 Medical and Hospital Equipment

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7602	7906	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR	PRECEDING 77	0.1	03
	CURRENT 78	0.1	05

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

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20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

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SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME:

NAME:

21. GENERAL USE

Foreign Intelligence Not Applicable

POC:DA

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Whole Body; (U) Diagnostic; (U) X-Ray; (U) Scanner; (U) Flying Spot; (U) Field Medicine; (U) Field Equipment

23. TECHNICAL OBJECTIVE.* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To provide engineering assistance in evaluating new diagnostic X-ray scanners being evolved for military field use.

24. (U) Professionally evaluate and assess new equipment as required.

25. (U) 7610 - 7709. Two versions of the scanning X-ray have been developed. The latest version digitizes the analog detector signal and provides much greater dynamic range. Provisions are being made to install the digital version in the University of Maryland Shock Trauma Unit for clinical evaluation.

*Available to contractors upon originator's approval.

DD FORM 1 MAR 68 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A, 1 NOV 65 AND 1498-1, 1 MAR 68 (FOR ARMY USE) ARE OBSOLETE. * U.S. GPO: 1974—540-943/8691

WHOLE BODY DIAGNOSTIC X-RAY SCANNER

3S762778A838.00.016

Detail Sheet

1. BACKGROUND.

This task was established on 30 January 1976. The objective is to provide engineering assistance for the evaluation and assessment of a new diagnostic X-Ray scanner being developed for Military Field use by American Science and Engineering, Inc., of Cambridge, MA.

Two systems have been developed and demonstrated at the ASYE Labs. The first system used analoge treatment of the detector signal. This limited the dynamic range of the processed signal and provided only limited image control by the radiologist without rescanning. The latest version digitizes the detector output and uses digital signal processing throughout. This method provides 2^{16} levels of intensity per picture element and thus greater image control to the radiologist without rescanning. In addition, the digitized format much more readily permits transmission over conventional communication channels.

It is planned to clinically evaluate the system by installing the digitized version in the Shock-Trauma Unit of the University of Maryland, Baltimore, Maryland, Hospital. The type of injuries and peak patient loads approximates the combat situation as closely as is possible during peace time.

2. CONCLUSIONS.

Clinical evaluation is the next logical step and should be done before any additional hardware improvements are initiated.

3. RECOMMENDATIONS.

Continue to monitor evaluation.

4. REFERENCES.

a. Letter, SGRD-UBE-G, dated 30 January 1976, subject: Whole Body Diagnostic X-Ray Scanner, Task No. A816.00.016.

b. Letter, SGRD-SDM, dated 17 February 1976, subject: Evaluation of Application for Support of Research.

c. Letter, SGRD-UBE-G, dated 3 March 1976, subject: Evaluation of Application for Support of Research Entitled, Development of a Whole Body Flying Spot X-Ray Medical Unit.

d. Letter, SGRD-SDM, dated 31 March 1976, subject: Evaluation of Application for Support of Research.

e. Letter, SGRD-UBE-G, dated 6 April 1976, subject: Evaluation of Addendum Material, submitted by investigator in Support of Research entitled, "Development of a Whole Body Flying Spot X-Ray Medical Unit".

f. Letter, SGRD-OPM, dated 29 June 1977, subject: Development/ Clinical Evaluation of a Whole Body Flying Spot Medical X-Ray Unit.

g. Memorandum for Contract Review Board, SGRD-RM, dated 23 August 1977, subject: Minutes from Contract Review Board.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION* DA 0B 6217	2. DATE OF SUMMARY* 77 10 01	REPORT CONTROL SYMBOL DD-DR&E(AR)636	
3. DATE PREV SUM'RY 77 04 29	4. KIND OF SUMMARY D. CHANGE	5. SUMMARY SCTY* U	6. WORK SECURITY* U	7. REGRADING* NA	8a. DISP'N INSTR'N NL	8b. SPECIFIC DATA-CONTRACTOR ACCESS ☒ YES ☐ NO	9. LEVEL OF SUM A. WORK UNIT

10. NO./CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62778A	3S762778A838	00	017
b. CONTRIBUTING				
XXXXXXXXX	CARDS 114f			

11. TITLE (Precede with Security Classification Code)*
(U) Mobile Battalion Aid/Clearing Stations, Engineering Evaluation of

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*
002400 Bioengineering; 009800 Medical and Hospital Equipment

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7704	7912	DA	C. In-House

17. CONTRACT/GRANT
a. DATES/EFFECTIVE: EXPIRATION:
b. NUMBER:*
c. TYPE: d. AMOUNT:
e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR	PRECEDING 77	0.0	00
	CURRENT 78	0.4	20

19. RESPONSIBLE DOD ORGANIZATION
NAME:* US Army Medical Bioengineering Research & Development Laboratory
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RESPONSIBLE INDIVIDUAL
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20. PERFORMING ORGANIZATION
NAME:* US Army Medical Bioengineering Research & Development Laboratory
ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)
NAME:* Malek, J.W.
TELEPHONE: (301) 663-7277; AUTOVON 343-7277
SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS
NAME: O'Connor, R.J.
NAME: POC:DA

21. GENERAL USE
Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Battalion Aid Station; (U) Field; (U) Clearing Station; (U) Mobile; (U) Field Medical Stations

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To evaluate suitability of the chassis and body of a Mobile Field Kitchen Trailer (MFKT) for transporting and utilization by the Battalion Aid Station and/or Clearing Station to provide assigned medical support in the Division Area of the Combat Zone.

24. (U) Upon receipt of the MFKT, an engineering/packing study will be initiated to ascertain capability.

25. (U) 7704 - 7710. Components of both the Battalion Aid and Clearing Stations were ordered and received. Purchase order to obtain one of the new MFKT was initiated with TROSCOM with delivery anticipated for first quarter FY78.

*Available to contractors upon originator's approval.

DD FORM 1 MAR 68 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A, 1 NOV 65 AND 1498-1, 1 MAR 68 (FOR ARMY USE) ARE OBSOLETE.
* U.S. GPO: 1974—540-843/8691

MOBILE BATTALION AID/CLEARING STATIONS,
ENGINEERING EVALUATION OF

3S762778A838.00.017

Detail Sheet

1. BACKGROUND.

It was desired that suitability of the chassis and body of a Mobile Field Kitchen Trailer (MFKT) for transporting existing field medical sets and utilization in an operational mode to provide assigned medical support in the Division Area of the Combat Zone.

2. CONCLUSIONS.

None.

3. RECOMMENDATIONS.

Initiate study upon receipt of MFKT from TROSCOM.

4. REFERENCES.

a. Letter, SGRD-SDM, dated 4 February 1977.

b. Letter, SGRD-UBE-G, dated 14 March 1977.

c. Letter, SGRD-SDM, dated 18 March 1977.

d. 1st Ind, SGRD-SDM, dated 12 April 1977.

e. Letter, SGRD-UBE-G, dated 28 April 1977

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA 0B 6208	77 04 29	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
77 01 14	H. TERMINATION	U	U	NA	NL	☒ YES ☐ NO	A. WORK UNIT

10. NO./CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62778	3S762778A838	00	018
b. CONTRIBUTING				
XXXXXXXXX	CARDS 114f			

11. TITLE (Precede with Security Classification Code)*

(U) Cabinetry, Medical Equipment Sets, Modular

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

002400 Bioengineering; 009800 Medical and Hospital Equipment

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7701	7906	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR	PRECEDING 7T	0.0	00
	CURRENT 77	0.0	00

19. RESPONSIBLE DOD ORGANIZATION

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20. PERFORMING ORGANIZATION

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ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* Patzer, N.H.

TELEPHONE: (301) 663-7277; AUTOVON 343-7277

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Prensky, W.C.

NAME: POC:DA

21. GENERAL USE

Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Field Equipment; (U) Field Medical Cabinets; (U) Field Modules; (U) Medical Equipment Sets

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To develop lightweight, sturdy, modular cabinetry to eliminate current deficiencies.

24. (U) Design, fabricate and evaluate a new family of modular inserts for field use.

25. (U) 7701 - 7703. Task terminated due to not being a research and development effort.

*Available to contractors upon originator's approval.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA 0B 6218	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISB'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
77 04 29	D. CHANGE	U	U	NA	NL	[X] YES [ ] NO	A. WORK UNIT

10. NO. CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62778A	3S762778A838	00	018
b. CONTRIBUTING				
XXXXXXXXX	CARDS 114f			

11. TITLE (Precede with Security Classification Code)*

(U) Personnel Decontamination Sets, Design of

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

002400 Bioengineering; 009800 Medical and Hospital Equipment

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7704	7906	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR	PRECEDING 77	0.2	05
	CURRENT 78	0.2	10

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

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RESPONSIBLE INDIVIDUAL

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20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

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SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Patzer, N.H.

NAME: POC:DA

21. GENERAL USE

Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code)

(U) Personnel Decontamination; (U) Chemical Decontamination; (U) Field Equipment; (U) Decontamination

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To develop personnel decontamination sets for use by the US Army Biomedical Laboratory, Edgewood Arsenal, MD; one set for use in a fixed installation with the other unit developed for field use.

24. (U) Investigate and evaluate current decontamination practices and materials. Design, fabricate and test sets based on the data accrued from the evaluation.

25. (U) 7704 - 7709. The initial problem statement did not provide sufficient technical information to establish equipment design parameters. Initial coordination has done more toward identifying problem areas than arriving at potential solutions. An outline of problem areas has been developed. Contact has been established with the Biomedical Laboratory and Chemical Systems Laboratory at APG, as well as the Navy and Air Force, to provide technical information and potential solutions. The Naval Research Laboratory provided information on the Navy Ash/Slash study for shipboard biological and chemical decontamination.

*Available to contractors upon originator's approval.

DD FORM 1 MAR 68 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A, 1 NOV 65 AND 1498-1, 1 MAR 68 (FOR ARMY USE) ARE OBSOLETE.

PERSONNEL DECONTAMINATION SETS, DESIGN OF

3S76277838.00.018

Detail Sheet

1. BACKGROUND.

USAMBRDL has been tasked to design and build equipment to: (a) decontaminate chemically contaminated personnel in the Toxic Exposure Aid Station (TEAS) at the Biomedical Laboratory, Aberdeen Proving Grounds, Maryland; and (b) decontaminate personnel on site prior to transport to the TEAS. Additional discussions with the Biomedical Laboratory, USAMBRDL and SGRD-OPM, indicate with the experience gained in accomplishment of (a) and (b), USAMBRDL shall build an experimental system to decontaminate casualties prior to admission to field medical facilities.

2. CONCLUSIONS.

Information made available to date by the Biomedical Laboratory and the Chemical Systems Laboratory, APG, is insufficient to establish design parameters for the equipment.

3. RECOMMENDATIONS.

Request detailed and specific information from cognizant organizations, necessary to develop personnel decontamination equipment.

4. REFERENCES.

a. Letter, SGRD-SDM, USAMRDC, dated 15 March 1977, subject: Construction of Decontamination Units for the U.S. Army Biomedical Laboratory.

b. Letter, DROAR-CLL-M, 10 May 1977, 1st Ind., Biomedical Laboratory, Edgewood Arsenal, MD, subject: Patient Decontamination for Medical Facilities, Task No. A838.00.018, 9 June 1977.

c. Trip Report, 20 July 1977, to Edgewood Arsenal, MD, subject: To discuss the state-of-the-art of Personnel Decontamination, 3 August 1977.

d. USAMBRDL, "Personnel Decontamination Problem Outline", dated 16 August 1977.

e. Memorandum for Record, USAMBRDL, SGRD-UBH-O, 14 September 1977, subject: Decontamination of Chemical Casualties.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA 0A 6250	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8A. DISB'N INSTR'N	8B. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
76 10 01	D. CHANGE	U	U	NA	NL	☒ YES ☐ NO	A. WORK UNIT

10. NO. CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62778A	3S762778A838	00	019
b. XXXXXXXXXX	62110A	3A162110A816	00	019
c. XXXXXXXXXX	CARDS 114f			

11. TITLE (Precede with Security Classification Code)*

(U) Dental Field Area Support System

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

009800 Medical and Hospital Equipment; 002400 Bioengineering

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
6912	CONT	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR	PRECEDING 77	0.1	02
	CURRENT 78	0.1	05

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

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RESPONSIBLE INDIVIDUAL

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20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* Malek, J.W.

TELEPHONE: (301) 663-7277; AUTOVON 343-7277

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Prensky, W.C.

NAME:

21. GENERAL USE

Foreign Intelligence Not Applicable

POC:DA

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Dental Field Equipment; (U) Dental Field Units; (U) Dental Portable Equipment; (U) Dental Field Systems; (U) Dental Field Support

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To clinically evaluate the evolving new generation of field dental equipment prototypes, within the concept of mutually supporting and complementary field treatment systems, and compatible with the current TO&E and standard field shelter systems.

24. (U) Assemble the necessary materiel and personnel and clinically evaluate.

25. (U) 7610 - 7709. Investigation to find a suitable replacement for the current automatic field dental X-ray processor was successful. A standard commercial unit manufactured in the United States has been obtained and arrangements for clinical evaluation are being arranged.

*Available to contractors upon originator's approval.

DD FORM 1 MAR 66 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A, 1 NOV 65 AND 1498-1, 1 MAR 66 (FOR ARMY USE) ARE OBSOLETE.

DENTAL FIELD AREA SUPPORT SYSTEM

3S762778A838.00.019

Detail Sheet

1. BACKGROUND.

This task was initiated to clinically evaluate evolving new generations of field dental equipment, employment of some in the field environment, and compatibility of this equipment with the Army Shelter System in which it would most generally be employed. First such evaluation was conducted during February-March 1970 at Fort Sam Houston, Texas, in which several items of new generation of field dental equipment were evaluated within the MUST inflatable Shelter element. The combat field environment was only simulated in this assessment as the shelter element was erected and used on a hard stand surface on the Main Post at Fort Sam Houston. A reasonable compatibility of shelter and equipment was indicated. In April 1971, a *Military Potential Test (MPT)* commenced in USAREUR to evaluate two field dental operating assemblages. This evaluation was unique in that the equipment was to be transported by convential Army carriers to a variety of remote troop locations where there was a need for dental support, and to be utilized in a variety of non-specific shelters by periodically changing operator/assistant teams. Then, for the first time, the dental equipment prototypes were receiving an evaluation wherein both use and abuse are factors and wherein a real measure of long term reliability and durability, in every shelter and support environment, were addressed. Adequate data were collected from this evaluation to establish basis for new programs for final modification and type classification action for new portable dental units.

2. CONCLUSIONS.

The work unit is valid developmental effort whereby new concepts of field dental equipment could be evaluated.

3. RECOMMENDATIONS.

This work unit should be retained until a complete assemblage of new generation of equipment is complete and standardized within the Federal Inventory.

4. REFERENCES.

a. D/F, SGRD-SDM, 5 December 1969.

b. Clinical Evaluation, Fort Sam Houston, Texas, March 1970.

c. Military Potential Test, USAREUR, February-May 1971.

d. Military Potential Test, Fort Jackson, S.C., November 1972 - January 1973.

e. User Evaluation of Dental Operating and Treatment Units, Comparison Test, USAIDR, December 1974.

f. Establishment of Task A838.00.039, 15 July 1975, to Develop a Field Utility Unit for Dental use.

g. Establishment of Task A838.00.015, 1 October 1976, to develop a New Field Dental Chair.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA 0B 6209	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISB'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
77 01 14	D. CHANGE	U	U	NA	NL	[X] YES [ ] NO	A. WORK UNIT

10. NO./CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62778A	3S762778A838	00	020
b. CONTRIBUTING				
XXXXXXXXXX	CARDS 114f			

11. TITLE (Precede with Security Classification Code)*

(U) Field Medical Gurney

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

002400 Bioengineering; 009800 Medical and Hospital Equipment

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7701	7812	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 77	0.1	03
FISCAL YEAR CURRENT 78	0.6	30

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

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NAME:* O'Connor, R.J.

TELEPHONE: (301) 663-7277; AUTOVON 343-7277

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Patzer, N.H.

NAME: POC:DA

21. GENERAL USE

Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Wheeled Litter; (U) Gurney; (U) Medical Gurney; (U) Field; (U) Medical Equipment

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To design and fabricate a field medical gurney for the movement of patients over semi-rough terrain.

24. (U) Design, fabricate and evaluate a gurney which will meet the requirements of field use.

25. (U) 7701 - 7709. A feasibility study was conducted and alternative approaches to the design of a field gurney were presented. Commercial sources of wheels and special purpose tires were searched. Fabrication of an initial breadboard has been initiated.

*Available to contractors upon originator's approval.

FIELD MEDICAL GURNEY

3S762778A838.00.020

Detail Sheet

1. BACKGROUND.

The U.S. Army Medical Bioengineering R&D Laboratory was assigned the task of performing a feasibility study related to the development of a wheeled stretcher for field use. The emphasis was on use within the field hospital or the clearing station. The gurney like appliance was to have the capability of easy movement over semi-rough terrain and to be easily managed by one person.

Other characteristics which the field unit should have, relate to weight; collapsibility; maintenance at the user level; and its ability to accept patients as the standard U.S. Army litter.

The results of a feasibility study, containing alternate approaches, were sent forward. Verbal approval was received to go ahead with the gathering of manufacturers literature and other relevant information prior to the design and fabrication of a unit.

2. CONCLUSIONS.

It is technically feasible to construct a field gurney for evaluation.

3. RECOMMENDATIONS.

Fabricate breadboard model and evaluate against stated requirements.

4. REFERENCES.

a. Letter, SGRD-UBE, 27 May 1976, subject: Outline Development Concept Plan.

b. Letter, SGRD-SDM, 22 December 1976, subject: Feasibility Study of Items from the Outline Development Concept Plan.

c. Letter, SGRD-UBE-G, 21 March 1977, subject: Field Medical Gurney, Task No. 838.00.020, and Development Approaches.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA 0B 6176	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
76 10 01	D. CHANGE	U	U	NA	NL	[X] YES [ ] NO	A. WORK UNIT

10. NO. CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62778A	3S762778A838	00	021
XXXXXXXXX	62110A	3A162110A816	00	021
XXXXXXXXX	CARDS 114f			

11. TITLE (Precede with Security Classification Code)* (U) Evaluation of Potential Hazards Associated with the Use of Root-Lowell Pro-ULV Portable Insecticide Aerosol Generator

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*
009800 Medical and Hospital Equipment; 005900 Environmental Biology; 016800 Toxicology

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7604	7806	DA	C. In-House

17. CONTRACT/GRANT
a. DATES/EFFECTIVE: EXPIRATION:
b. NUMBER:*
c. TYPE: d. AMOUNT:
e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 77	0.5	18
FISCAL YEAR CURRENT 78	0.1	05

19. RESPONSIBLE DOD ORGANIZATION
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ASSOCIATE INVESTIGATORS
NAME: Desrosiers, R.E.
NAME: Gula, P.R. POC:DA

21. GENERAL USE
Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Root-Lowell Pro-ULV; (U) Insecticide Aerosol Generator; (U) Ultra Low Volume (ULV) Dispersal; (U) Toxicity; (U) Droplet Size Spectrum

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) Following the use of the Pro-ULV Portable Insecticide Aerosol Generator, pest controllers have complained of headaches and nausea. It is suspected that due to the design of the equipment, the spectrum of insecticide particles produced is too small to be effectively filtered out by currently used respiratory protective equipment. The spectrum of particle sizes produced will be determined and related to the toxicity of the insecticide being used.

24. (U) To determine droplet size spectrum being produced by the equipment. Following these determinations request toxicological data be provided on the insecticide used in the equipment at the droplet size spectrum previously determined. Request for assistance will be made to the Toxicology Division, US Army Environmental Hygiene Agency, Aberdeen Proving Ground, MD.

25. (U) 7610 - 7709. The pesticide droplet spectra produced by the Pro-ULV was determined. Evaluations of several respiratory devices used in conjunction with the operation of the ULV generator indicated that the NIOSH approved pesticide cartridges were more efficient than the unapproved cartridges in filtering out droplets smaller than 4.8 microns. All tested cartridges were equally effective in capturing droplets larger than 4.8 microns. Toxicological tests have not been completed. A technical report will be prepared upon receipt of the toxicology data.

*Available to contractors upon originator's approval.

Evaluation of Potential Hazards Associated With the
Use of Root-Lowell Pro® ULV Portable Insecticide Aerosol Generator
3S762778A838.00.021

Detail Sheet

1. Background:

The Pro® ULV Portable Insecticide Aerosol Generator is a non-standard item which is currently being used extensively in military pest control operations. Following use of the equipment, pest control operators have suffered headaches and nausea. This research project was therefore initiated to determine if these problems were resulting from the design of the equipment wherein a great many small insecticide droplets were being produced which could not be effectively filtered out by the respiratory protective equipment currently in use.

A Royco® Model 245/508 Particle Counter has been utilized to determine the spectrum of insecticide droplets produced by the ULV generator. Several respiratory devices currently being used by military pest control operators have been evaluated for efficiency in removing the droplets produced by the ULV generator.

A request for a toxicological evaluaton of the insecticide routinely used in the ULV generator has been made to the Toxicology Division of the US Army Environmental Hygiene Agency (USAEHA) and the results are being awaited.

2. Conclusions:

The pesticide droplet spectra produced by the Pro® ULV was determined. Evaluations of several respiratory devices used in conjunction with the operation of the ULV generator indicated that the NIOSH approved pesticide cartridges were more efficient than the unapproved cartridges in filtering out droplets small than 4.8 μ. All tested cartridges were equally effective in capturing droplets larger than 4.8 μ. Toxicological tests have not been completed. A technical report will be prepared upon receipt of the toxicology data.

3. Recommendation:

That a technical report be prepared upon receipt of the toxicological evaluation results.

4. References:

a. Letter, ATEN-FE-BG, to HQDA(SGRD), dated 30 January 1976, subject: Potential Hazards in Use of PRO-ULV® Machine Due to Equipment Design.

b. Letter, SGRD-SDM to USAMBRDL, dated 10 March 1976, subject: as above.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA OB 6210	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
77 01 14	D. CHANGE	U	U	NA	NL	☒ YES ☐ NO	A. WORK UNIT

10. NO./CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62778A	3S762778A838	00	022
b. CONTRIBUTING				
XXXXXXXXX	CARDS 114f			

11. TITLE (Precede with Security Classification Code)*

(U) Trancrit, Emergency Medical Equipment

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

002400 Bioengineering; 009800 Medical and Hospital Equipment

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7701	7909	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 77	0.1	04
FISCAL YEAR CURRENT 78	0.1	15

19. RESPONSIBLE DOD ORGANIZATION

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20. PERFORMING ORGANIZATION

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SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Stup, J.L.

NAME: POC:DA

21. GENERAL USE

Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Ambulance; (U) Medical Transportation; (U) Medical Equipment; (U) Medical Telemetry; (U) Patient Monitoring

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To develop a system for air/ground ambulances to monitor critically ill patients being transported from point to point.

24. (U) Design, fabricate and evaluate patient monitors to be operated by paramedical personnel in the evacuation of sick and injured patients.

25. (U) 7701 - 7709. A feasibility study was performed and various options identified. The study has been submitted to HQDA (SGRD-OPM) for guidance.

*Available to contractors upon originator's approval.

TRANCRIT, EMERGENCY MEDICAL EQUIPMENT

3S762778A838.00.022

Detail Sheet

1. BACKGROUND.

This Laboratory was requested to conduct a feasibility study on the requirements and limitations of providing emergency medical equipment for the monitoring of the severely disabled soldier during evacuation from a tactical situation. Three aspects of the problem were identified as well as the equipment required to satisfy the most serious situation.

2. CONCLUSIONS.

Transportation of critical unstabilized patients (for periods greater than one hour), monitoring of heart function, respiration rate and blood pressure is highly desirable. In addition, to the monitors, equipment to treat abnormal conditions detected by the monitors must be included.

3. RECOMMENDATIONS.

A decision should be made based on scenarios of future operations.

4. REFERENCES.

a. Letter, SGRD-SDM, dated 22 December 1976, subject: Feasibility Study of Items from the Outline Development Plan.

b. Trip Report, University of Maryland Shock Trauma Unit, 4 March 1977, L. Salisbury, USAMBRDL, subject: Emergency Transportation of Patients.

c. Meeting held at USAMBRDL, 10 March 1977, subject: Field Transportation of the Wounded Soldier.

d. Letter, SGRD-UBE-G, dated 17 March 1977, subject: TRANCRIT, Emergency Medical Equipment.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION* DA 0B 6211	2. DATE OF SUMMARY* 77 10 01		REPORT CONTROL SYMBOL DD-DR&E(AR)636
3. DATE PREV SUM'RY 77 01 14	4. KIND OF SUMMARY D. CHANGE	5. SUMMARY SCTY* U	6. WORK SECURITY* U	7. REGRADING* NA	8a. DISP'N INSTR'N NL	8b. SPECIFIC DATA-CONTRACTOR ACCESS ☒ YES ☐ NO	9. LEVEL OF SUM A. WORK UNIT
10. NO./CODES:*	PROGRAM ELEMENT	PROJECT NUMBER		TASK AREA NUMBER	WORK UNIT NUMBER		
a. PRIMARY	62778A	3S762778A838		00	023		
b. CONTRIBUTING							
XXXXXXXXX	CARDS 114f						

11. TITLE (Precede with Security Classification Code)*

(U) Light, Surgical, Battalion Aid Station

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

002400 Bioengineering; 009800 Medical and Hospital Equipment

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7701	7807	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 77	0.1	01
FISCAL YEAR CURRENT 78	0.4	20

19. RESPONSIBLE DOD ORGANIZATION

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20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

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SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: O'Connor, R.J.

NAME: POC:DA

21. GENERAL USE

Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Field Light; (U) Surgical Light; (U) Battalion Aid Station; (U) Field Surgery; (U) Field Medical Equipment

23. TECHNICAL OBJECTIVE.* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To redesign and improve the standard surgical light used in the Battalion Aid Station.

24. (U) Review the deficiencies; redesign and fabricate a new light with stand and evaluate for acceptance.

25. (U) 7701 - 7709. Feasibility study completed. A list of alternative solutions forwarded to MRDC for review and comments.

*Available to contractors upon originator's approval.

DD, FORM 1 MAR 68 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A, 1 NOV 65 AND 1498-1, 1 MAR 68 (FOR ARMY USE) ARE OBSOLETE. * U.S. GPO: 1974—540-843/8891

LIGHT, SURGICAL, BATTALION AID STATION

3S762778A838.00.023

Detail Sheet

1. BACKGROUND.

The purpose of the task is to redesign the surgical light (NSN-6530-00-299-8595). The task was established on 22 December 1976. Review of: (a) current surgical light drawings and specifications; (b) current surgical lighting recommendations; and (c) commercially available lights and technical literature, was initiated and alternate solutions to the problem evaluated. The alternate solutions were forwarded to HQDA (SGRD-SDM) for review and comment prior to the meeting of the Joint Working Group (JWG) during the week of 22 April 1977. Commercial and military lights under consideration as an alternate solution, were ordered and received prior to the JWG Meeting for examination and display. The JWG did not discuss the Surgical Light problem due to insufficient time. The list of alternative solutions was forwarded to AHS on 21 June 1977. No response to date.

2. CONCLUSIONS.

It is technically feasible to improve the existing light.

3. RECOMMENDATIONS.

Establish the essential and desirable characteristics of the improved light.

4. REFERENCES.

a. MIL-SPEC, MIL-L-36189, 13 April 1964, "Light, Surgical, Bracket, Portable, Battery Operated", NSN 6530-00-299-8595, DPSC Dwg. 2009.

b. Department of the Army, U.S. Army Medical Research and Development Command, Washington, D.C., 20314, SGRD-SDM, 22 December 1976, subject: Feasibility Study of Items from the Outline Development Concept Plan.

c. U.S. Army Medical Bioengineering Research and Development Laboratory, Fort Detrick, Frederick, Maryland, SGRD-UBE-G, 9 March 1977, subject: Light, Surgical, Battalion Aid Station, Feasibility Study.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA 0B 6212	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISB'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
77 04 29	D. CHANGE	U	U	NA	NL	[X] YES [ ] NO	A. WORK UNIT

10. NO./CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62778A	3S762778A838	00	024
b. CONTRIBUTING				
XXXXXXXXX	CARDS 114f			

11. TITLE (Precede with Security Classification Code)*

(U) X-Ray Apparatus, Dental, Portable (6525-00-690-3214), Modification of

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

009800 Medical and Hospital Equipment; 002400 Bioengineering

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7704	7712	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 77	0.2	05
FISCAL YEAR CURRENT 78	0.2	10

19. RESPONSIBLE DOD ORGANIZATION

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SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Prensky, W.C. POC:DA

NAME:

21. GENERAL USE

Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code)

(U) X-Ray; (U) Dental X-Ray; (U) Field X-Ray; (U) Portable X-Ray

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) As directed by DASG-RO-D, redesign the internal packaging configuration of the field container of subject item to accommodate newly available tubehead and timer/voltage compensator components which will upgrade subject item to comply with revised standards for X-ray equipment.

24. (U) Obtain new tubehead and timer/voltage compensator components from the manufacturer and redesign the internal packaging configuration of the field chest to receive these components and evaluate.

25. (U) 7704 - 7709. The new components were received from the manufacturer. Redesign of the foam insert protective/cushioning was accomplished and the foam insert was modified to accommodate the new components. Engineering Evaluation (by USAMBRDL) Radiation Emersion Tests (by AEHA) and Maintenance Evaluation (by SGMMA-MP) were conducted.

*Available to contractors upon originator's approval

X-RAY APPARATUS, DENTAL, PORTABLE
(NSN 6525-00-690-2214), MODIFICATION OF
3S762778A838.00.024

Detail Sheet

1. BACKGROUND.

With the introduction of new standards for X-Rays, the current field Dental X-Ray Unit was not acceptable for use. The manufacturer (North American Phillips Company) has redesigned a new tubehead, callimotor and line compensator/timer combination, which will meet the new standards. Prototypes were received in July and redesign of the shipping/support container was initiated.

2. CONCLUSIONS.

Modifications to the container to receive the new components are satisfactory.

3. RECOMMENDATIONS.

Conduct Operational Testing to obtain user evaluation.

4. REFERENCES.

a. Letter, SGRD-SDD, dated 29 March 1977.

b. Letter, SGRD-UBE-G, dated 28 April 1977.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA 0B 6213	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISB'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
77 03 21	D. CHANGE	U	U	NA	NL	☒ YES ☐ NO	A. WORK UNIT

10 NO 'CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62778A	3S762778A838	00	025
b. CONTRIBUTING				
c. XXXXXXXXXX	CARDS 114f			

11. TITLE (Precede with Security Classification Code)*

(U) Evaluation of Rapid Non-Destructive Insect Detector

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

002400 Bioengineering; 002600 Biology

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7703	7809	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 77	0.2	06
FISCAL YEAR CURRENT 78	1.0	50

19. RESPONSIBLE DOD ORGANIZATION

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SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Salisbury, L.L.

NAME: Schiefer, B.A.

POC:DA

21. GENERAL USE

Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code)

(U) Pest Control; (U) Insect Detector; (U) Stored Products; (U) Commodities; (U) Insect Surveillance

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To conduct evaluation of the Rapid Non-Destructive Insect Detector System developed at the U.S. Department of Agriculture, Agricultural Research Service, Stored Products Laboratory, Savannah, Georgia. This detector was developed under a research contract awarded by the Headquarters, US Army Medical Research and Development Command, Washington, DC.

24. (U) Test protocols will be developed and actual field evaluations will be conducted in US Army commodity storage warehouses to ensure that the Rapid Non-Destructive Insect Detector will effectively detect stored-products insect infestations in stored commodities.

25. (U) 7703 - 7709. Technical problems have been encountered in the operation of the machine and the container system. These have been somewhat resolved. An abbreviated test protocol has been prepared and the machine is being evaluated in accordance with the test protocol under simulated operational conditions.

*Available to contractors upon originator's approval

Evaluation of Rapid Non-Destructive Insect Detector

3S762778A838.00.025

Detail Sheet

1. Background:

a. A Rapid Non-Destructive Insect Detector System was developed by the US Department of Agriculture, Stored Products Laboratory, Savannah, GA under a research contract with the US Army Medical Research and Development Command (USAMRDC). At the direction of USAMRDC, the US Army Medical Bioengineering R&D Laboratory (USAMBRDL) initiated a work unit to coordinate a test program in cooperation with Defense Personnel Supply Center (DPSC) and the Food and Drug Administration (FDA) to test the system and insure its reproducibility and attainment of realistic results.

b. A prototype unit has been provided to USAMBRDL. Equipment operation and familiarization have been completed. Several technical problems have been encountered in the system. Failure of the machine to maintain a constant vacuum for a sustained period, development of an insect infestation in the interior lines of the machine, and poor sealing and placement of the vent ports in the bag system have slowed the evaluation.

c. Formal evaluation of the unit in accordance with the prepared protocol is in progress.

d. An advanced prototype is being prepared by personnel at the USDA, Stored Products Laboratory, Savannah, GA. This unit is scheduled to be delivered to USAMBRDL during December 1977. At that time, this unit will be evaluated.

2. Conclusions:

Preliminary evaluations at this time indicate that the initial unit may have only limited operational value due to operational time requirements and the difficulty in ascertaining if low level infestations are present.

3. Recommendations:

a. That this work unit be maintained in the 838 RDTE program.

b. That the new unit be evaluated in-house in accordance with the abbreviated test protocol and if found acceptable, be taken into a DPSC warehouse for field evaluation.

4. Reference:

Letter, SGRD-SDM to USAMBRDL, dated 7 March 1977, subject: Testing of Rapid Non-Destructive Insect Detector.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA 0B 6221	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISB'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
77 06 01	D. CHANGE	U	U	NA	NL	[X] YES [ ] NO	A. WORK UNIT

10. NO./CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62778A	3S762778A838	00	026
b. CONTRIBUTING				
XXXXXXXXXX	CARDS 114f			

11. TITLE (Precede with Security Classification Code)*

(U) Vacuum Stretcher Immobilizer (VSI), Engineering Evaluation of

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

002400 Bioengineering; 009800 Medical and Hospital Equipment

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7706	7803	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 77	0.1	02
FISCAL YEAR CURRENT 78	0.1	05

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering

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Fort Detrick, Frederick, MD 21701

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20. PERFORMING ORGANIZATION

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ADDRESS:* Research & Development Laboratory
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PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* O'Connor, R.J.

TELEPHONE: (301) 663-7277; AUTOVON 343-7277

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Cranford, H.B.

NAME: POC:DA

21. GENERAL USE

Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Field; (U) Body Splint; (U) Body Cast; (U) Vacuum Stretcher Immobilizer; (U) Medical Equipment

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To evaluate a commercially available vacuum operated patient immobilizer stretcher (VSI) for use in moving patients in rear areas.

24. (U) Procure VSI units for test and determine its suitability for use in field Army medical facilities.

25. (U) 7706 - 7709. VSI units have been received for evaluation test. Program has been initiated.

*Available to contractors upon originator's approval.

DD FORM 1 MAR 68 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A, 1 NOV 68 AND 1498-1, 1 MAR 68 (FOR ARMY USE) ARE OBSOLETE. * U.S. GPO: 1974—540-843/8

VACUUM STRETCHER IMMOBILIZER (VSI),
ENGINEERING EVALUATION OF
3S762778A838.00.026

Detail Sheet

1. BACKGROUND.

USAMBRDL was requested to comment on several papers dealing with Vacuum Immobilizers. As a result of these comments and because of the potential applicability of such appliances in field medicine, USAMRDC requested that USAMBRDL do an engineering evaluation of one type of Vacuum Stretcher Immobilizer (VSI).

The Vacuum Stretcher Immobilizer, of foreign manufacture, is available in the United States. This particular VSI has also been field tested in Germany and a translation of this evaluation report is being prepared by Medical Intelligence.

Procurement action was initiated and two of the VSI Units have been reserved for testing. A test plan has been initiated.

2. CONCLUSIONS.

After approval of a suitable plan for engineering evaluation of the VSI Units, testing will commence and the results of such tests forwarded with recommendations.

3. RECOMMENDATIONS.

None.

4. REFERENCES.

a. Letter, SGRD-UBZ, 11 April 1977, subject: Vacuum Stretcher Immobilizer Information with comments.

b. Letter, SGRD-RO-D, 26 May 1977, subject: Vacuum Stretcher Immobilizer Information, with indorsements.

c. Letter, SGRD-UBE-G, 8 June 1977, subject: Vacuum Stretcher Immobilizer (VSI), Engineering Evaluation of - Task No. A838.00.026.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION* DA 0A 6296	2. DATE OF SUMMARY* 77 10 01	REPORT CONTROL SYMBOL DD-DR&E(AR)636
3. DATE PREV SUM'RY 76 10 01	4. KIND OF SUMMARY D. CHANGE	5. SUMMARY SCTY* U	6. WORK SECURITY* U	7. REGRADING* NA	8a. DISP'N INSTR'N NL	8b. SPECIFIC DATA-CONTRACTOR ACCESS ☒ YES ☐ NO	9. LEVEL OF SUM A. WORK UNIT

10. NO. CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62778A	3S762778A838	00	027
b. CONTRIBUTING	62110A	3A162110A816	00	027
c. CONTRIBUTING	CARDS 114f			

11. TITLE (Precede with Security Classification Code)* (U) Evaluation of Skid Mounted and Special Purpose Ultra Low Volume (ULV) Pesticide Dispersal Equipment

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*
009800 Medical and Hospital Equipment; 002400 Bioengineering

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7503	CONT	DA	C. In-House

17. CONTRACT/GRANT
a. DATES/EFFECTIVE: EXPIRATION:
b. NUMBER:*
c. TYPE: d. AMOUNT:
e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 77	0.6	18
FISCAL YEAR CURRENT 78	1.0	45

19. RESPONSIBLE DOD ORGANIZATION
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PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)
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TELEPHONE: (301) 663-7237; AUTOVON 343-7237
SOCIAL SECURITY ACCOUNT NUMBER:

21. GENERAL USE
Foreign Intelligence Not Applicable

ASSOCIATE INVESTIGATORS
NAME: Driggers, D.P.
NAME: Nelson, J.H. POC:DA

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Leco HD; (U) Micro Gen MS2-15; (U) Micro Gen LS2-15; (U) Micro Gen RS1W-5E; (U) Engineer Tests; (U) Ultra Low Volume (ULV)

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To determine the durability of commercially available Ultra Low Volume (ULV) pesticide dispersal equipment by comparative type engineering tests. Units will be used by military medical and engineer personnel for controlling mosquito and other flying insects. Results will provide the user agencies with comparative durability data for purchase through military channels.

24. (U) To determine the operational capabilities of skid mounted and special purpose ULV pesticide dispersal equipment by quantitative and qualitative methods. Measurable quantitative parameters include: particle size determination and maintenance of desired pressure and flow rate. General engineering design observations will include: corrosive effect of pesticide used during tests, verification of manufacturers' claim of performance specifications, general durability definitions as applied to mean time between breakdown, maintenance time, gas and oil consumption and definition of high mortality repair parts.

25. (U) 7610 - 7709. Evaluations of the Leco HD, Micro Gen Model L52-15 and Micro Gen MS2-15 have been completed. Final reports have been prepared and are in the review process, awaiting publication. Evaluation of the Micro Gen RS1W-5E, ULV remote pesticide dispersal unit is currently in progress.

*Available to contractors upon originator's approval.

DD FORM 1 MAR 68 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A, 1 NOV 65 AND 1498-1, 1 MAR 68 (FOR ARMY USE) ARE OBSOLETE. * U.S. GPO: 1974—540-843/8691

Evaluation of Skid Mounted and Special Purpose
Ultra Low Volume (ULV) Pesticide Dispersal Equipment
3S762778A838.00.027

Detail Sheet

1. Background:

a. For over a decade, ultra low volume (ULV) dispersal of concentrated insecticides has been an accepted practice for controlling flying insects. Today a large variety of commercial equipment exists for this purpose. However, there is no standard Army pesticide dispersal equipment currently available for the ULV application of insecticides.

b. In response to a request from the Department of Defense Armed Forces Pest Control Board (letter, AFPCB, 9 June 1975, subject: Durability of Pesticide Dispersal Equipment), US Army Medical Research and Development Command tasked (letter, SGRD-SDM, 16 October 1975, subject: Engineering Design and Durability Testing) the US Army Medical Bioengineering Research and Development Laboratory, to conduct testing for all commercial pest management equipment that may have military relevance. The work unit for this evaluation, Ultra Low Volume (ULV) Dispersal Equipment was established to evaluate skid mounted ULV aerosol generators. Evaluation of the Leco Model HD ULV aerosol generator began in the 816 project area, but was moved to the 838 project area during FY77.

c. Testing has been completed on the Leco HD, Micro-Gen LS2-15 and Micro-Gen MS2-15 skid mounted ULV insecticide aerosol generators. Final USAMBRDL technical reports are under preparation and are expected to be published shortly.

d. Evaluation of the Micro-Gen Model RE1-5 ULV remote insecticide dispersal unit is in progress.

2. Conclusions:

a. The Micro-Gen Models LS2-15 and MS2-15 failed to satisfactorily complete the specified 750 hour evaluation program.

b. The Leco model HD unit satisfactorily completed the evaluation program.

3. Recommendations:

a. That this work unit be continued in the 838 project area.

b. That all new incoming evaluation tasks of skid mounted and special purpose pesticide dispersal equipment be incorporated into this work unit.

Evaluation of Skid Mounted and Special Purpose Ultra Low Volume (ULV) Pesticide Dispersal Equipment cont'd

4. References:

a. Letter, AFPCB to HQDA(SGRD-SDM) dated 9 June 1975, subject: Durability of Pesticide Dispersal Equipment.

b. Memorandum, HQDA(SGRD-SDM) dated 9 September 1975, subject: Responsibility for Research and Development of Pesticide Dispersal Equipment.

c. Letter, HQDA(SGRD-SDM) to USAMBRDL dated 16 October 1975, subject: Engineering Design and Durability Testing.

d. Letter, AFPCB to HQDA(SGRD-SDM) dated 30 November 1976, with indorsement to USAMBRDL dated 6 January 1977, subject: Testing of Equipment for Standardization.

e. Letter, SGRD-UBH to Micro-Gen Equipment Corporation, San Antonio, TX 78216, dated 4 April 1977 with indorsement back to USAMBRDL dated 13 April 1977, subject: Engineering Design and Durability Evaluation.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA 0A 6259	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
76 10 01	D. CHANGE	U	U	NA	NL	[X] YES [ ] NO	A. WORK UNIT

10. NO./CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62778A	3S762778A838	00	028
XXXXXXXXX	62110A	3A162110A816	00	028
XXXXXXXXX	CARDS 114f			

11. TITLE (Precede with Security Classification Code)*

(U) Pulsed Water Pressure Device for Arm and Hand Washing

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

009800 Medical and Hospital Equipment; 002400 Bioengineering

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7012	7809	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 77	0.1	02
FISCAL YEAR CURRENT 78	0.1	05

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

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RESPONSIBLE INDIVIDUAL

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20. PERFORMING ORGANIZATION

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ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* Cranford, H.B.

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SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Prensky, W.C.

NAME: POC:DA

21. GENERAL USE

Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code)

(U) Hand Washer; (U) Surgery; (U) Sterility; (U) Hand Scrubbing; (U) Pulsed Water

23. TECHNICAL OBJECTIVE.* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To fabricate a hand washer permitting surgical washing of hands in a shorter time than with conventional scrubbing techniques in field medical facilities.

24. (U) Investigate various means of delivering pulsating water within a confined cylinder, fitted with leakproof collars into which hands can be inserted for washing. Coordination of effort to be made with USAIDR.

25. (U) 7610 - 7709. The research unit fabricated at USAMBRDL is under evaluation by USAIDR in order to establish design parameters. It has been requested that the unit be returned upon completion of test.

*Available to contractors upon originator's approval.

DD FORM 1 MAR 68 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A, 1 NOV 65 AND 1498-1, 1 MAR 68 (FOR ARMY USE) ARE OBSOLETE.

* U.S. GPO: 1974-548-043/6681

PULSED WATER PRESSURE DEVICE

FOR ARM AND HAND WASHING

3S762778A838.00.028

Detail Sheet

1. BACKGROUND.

The objective of the task is to fabricate a hand washer permitting surgical washing of hands in a shorter time than with conventional scrubbing techniques in field medical facilities.

The task was established 7 December 1970 (reference 4a) as Work Unit No. 816.14.028. On 27 May 1971 (reference 4b) the technical characteristics of the unit were established in greater detail. The characteristics were based on the USAIDR's breadboard unit. A briefing was held on 18 October 1971 (reference 4c) where the newly completed unit was demonstrated and changes recommended to improve versatility. The unit was shipped to USAIDR on 10 December 1971.

Colonel Cutright, et al, published a paper in February 1972 (reference 4d) giving results of work with the USAIDR breadboard unit which was not fabricated by MERDL. USAIDR indicated on 2 August 1972 (reference 4e) that the MERDL unit had been thoroughly tested and further testing for 15-18 months will be required to complete the proposed projects. The additional testing will evaluate different pressures, chemicals, hole size, etc.

On 25 July 1973, a meeting was held (reference 4f) where USAIDR stated their requirements for a new breadboard model.

A meeting between USAMBRDL and USAIDR personnel was held 2 April 1974 (reference 4g) in which the technical characteristics of the USAMBRDL Unit was presented to USAIDR. USAIDR suggested several changes to the unit. A demonstration of the unit's capabilities was given. It was agreed that USAMBRDL personnel would perform all changes and major maintenance while the unit is at USAIDR. Another meeting was held between USAIDR and USAMBRDL on 24 April 1974 (reference 4h). The unit with changes was demonstrated. It was requested that minimum water level and maximum disinfectant concentrations be determined prior to delivery to USAIDR. The tests were performed and an operational manual prepared with delivery of the unit to USAIDR on 31 May 1974 (reference 4i). The unit (as delivered) has seven parameters that can be changed to optimize the function of the unit Four of the parameters can be varied by USAIDR personnel.

Through the month of July 1974, USAMBRDL personnel trained USAIDR personnel and observed testing procedures. The unit was moved by USAIDR to the maternity ward at Walter Reed Hospital, 30 May 1975, for tests. Minor technical problems developed during the two years of operation, all of which were satisfactorily resolved. In January 1975 and September 26, 1975, articles appeared in Military Medicine (Reference 4j) and Stripe (Reference 4k) discussing the Arm and Hand Washers developed by USAIDR. The latter articel was based on the USAMBRDL model. On 19 April 1976, the unit was returned to USAIDR.

A meeting was held between USAIDR, USAMRDC and USAMBRDL, 18 May 1976 (Reference 4l) in which USAIDR expressed the hope of preparing a report by Fall 1976. A report was prepared 6 August 1976, on the hospital testing by USAIDR (Reference 4m).

Literature searches have been performed in the areas of pulsating jet lavage. The only relevant paper found to date was published in February 1972 (Reference 4d).

2. CONCLUSIONS.

Sufficient data is not available to adequately define and design equipment for use as a presurgical arm and hand scrub device.

3. RECOMMENDATIONS.

None.

4. REFERENCES.

a. Letter, USAMRDC, MEDDH-MM, 7 Dec 1970, subject: New Work Units under Task No. 3A062110A816.14.

b. Rumore, T. T. and Chasin, J., Memorandum for the Record - Trip Report, Re: Subtask 816.14.027 - Water Pressure Device for Cleaning Anesthesia Equipment; and Subtask 816.14.028, Water Pressure Device for Arm and Hand Washing, 27 May 1971, MERDL.

c. Trip Report, USAMRDC, SGRD-SDM, 18 Oct 1970, Inspection of Bread-board Model of Pulsed Surgical Hand Scrubber and Conference Regarding Future Direction of Development, Major M. M. Belenry.

d. Cutright, D.; Bhaskar, S.; Gross, A.: et al., A New Method of Presurgical Hand Cleaning, Oral Surgery, Oral Medicine and Pathology, Vol. 33, No. 2, pp 162-127, Feb 1972.

e. Letter, U.S. Army Institute of Dental Research, Water Reed Army Medical Center, Washington, D.C., SGRD-UDP, 4 Aug 1972, subject: None.

f. Memorandum for Record, USAMBRDL, 1 Aug 1973, subject: Arm and Hand Washer, USAMBRDL, Task 816.14.028.

g. Memorandum for Record, USAMBRDL, 2 April 1974, subject: Pulsed Water Pressure Device for Arm and Hand Washing, Task No. 816.14.028.

h. Memorandum for Record, USAMBRDL, SGRD-UBX, 24 April 1974, subject: Pulsed Water Pressure Device for Arm and Hand Washer, Task No. 816.14.028.

i. Memorandum for Record, USAMBRDL, SGRD-UBE-G, 3 June 1974, subject: Arm and Hand Washer, USAMBRDL Task 816.14.028.

j. Military Medicine, AMSUS News Letter, Jan 1975, Vol. 140, No. 1.

k. Chidel, Beverly, "Scrubbing In: USAIDR Has Made the Process Faster and More Effective", "The Stripe", Vol. XXXI, No. 37, September 26, 1975, Markap Publishing Company.

l. Memorandum for Record, USAMBRDL, H. Bruce Cranford, Jr., 18 May 1976.

m. Letter, U.S. Army Institute of Dental Research, Walter Reed Army Medical Center, Washington, D.C., SGRD-UDZ, 6 Aug 1976, subject: None.

n. Letter, U.S. Army Medical Research and Development Command, Washington, D.C., SGRD-SDM, 10 Sep 1976, subject: Pulsed Water Pressure Device for Arm and Hand Scrubbing.

o. Memorandum for Record, USAIDR, SGRD-UDZ, subject: Meeting Concerning the Future of Hand Scrubber, dated 13 Dec 1976.

p. Trip Report, subject: To Discuss Changes to the Arm and Hand Washer, 16 Dec 1976, USAMBRDL, dated 27 Dec 1976.

q. Dewar, N., Gravens, D., "Effectiveness of Septisol Antiseptic Foam as a Surgical Scrub Agent", Applied Microbiology, Oct 1973, pgs 544-549, Vol. 26, No. 4.

r. Trip Report, subject: To Examine and Repair Arm and Hand Washer, 14 Apr 1977, USAMBRDL, dated 21 April 1977.

s. D/F, subject: Pulsed Water Device for Hand and Arm Scrubbing", USAMRDC, SGRD-RO, 8 May 1977.

t. Letter, DAJA-PA, 8 July 1977, subject: None., to Mr. James Kellum, President, Delta Engineering and Sales, Inc., Arlington, Texas.

u. Patent, U.S. #3,757,800, September 16, 1973, Pulsating Hydrojet Lavage Device, Bmaska, et al.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA 0A 6260	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISS'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
76 10 01	D. CHANGE	U	U	NA	NL	[X] YES [ ] NO	A. WORK UNIT

10. NO./CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62778A	3S762778A838	00	029
b. XXXXXXXXX	62110A	3A062110A816	00	029
c. XXXXXXXXX	CARDS 114f			

11. TITLE (Precede with Security Classification Code)*

(U) Universal Ventilator

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

009800 Medical and Hospital Equipment; 002400 Bioengineering

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7012	7806	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING	77	0.0	00
FISCAL YEAR CURRENT	78	0.1	01

19. RESPONSIBLE DOD ORGANIZATION

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NAME:* Ismach, A.

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SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Malek, J.W.

NAME: POC:DA

21. GENERAL USE

Foreign Intelligence Considered

22. KEYWORDS (Precede EACH with Security Classification Code)

(U) Ventilator; (U) Respirator; (U) Controlled Assister; (U) Breather; (U) Intermittent Positive Ventilator; (U) Resuscitator;

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

(U) Anes Ventilator; (U) Mechanical Ventilator

23. (U) To develop a safe, effective, mechanical ventilator suitable for use on all age groups, as a surgical ventilator in the operating room and as a ventilator/resuscitator in the recovery room.

24. (U) To refine existing circuitry to obtain greater dependability, ruggedness and increased sensitivity in the assister mode of operation. Evaluation will be made on laboratory analogs prior to experimental use on animals and clinical evaluation on humans.

25. (U) 7610 - 7709. Task held open pending receipt of LR which will move efforts into advanced development program. Comments furnished on 22 July 1977 to USAMRDC (SGRD-RO-D) and HSA-CDM on proposed LR and on the US Navy Respirator Development Program (Contract N61339-75-C-0013 awarded to the General Electric Company).

*Available to contractors upon originator's approval.

UNIVERSAL VENTILATOR

3S762778A838.00.029

Detail Sheet

1. BACKGROUND.

The task was established to develop a Universal Multi-purpose Ventilator that could be used throughout the hospital, on all age groups. This unit was intended to replace specialty ventilators, thereby reducing types of ventilators required in a field hospital, reducing numbers and types of units required, thereby reducing logistic requirements and simplifying maintenance and training.

The task was originally established as an ILIR Porgram (91C and B) based on specific needs for a new born infant ventilator expressed by Dr. Robert Hustead, M.D., during the period that he served as a consultant in the development of the field resuscitator (Task 3A643324D820.01.006). In July 1963, a prototype was forwarded to Dr. Hustead at the University of Kansas Medical Center where in testing he experienced unreliable results at extremely low flow rates. The difficulty was pin-pointed to the conventional non-rebreathing valve employed. A new valve was designed which has no moving parts and operates on a continual flow concept. The valve permitted a cycling unit with wider tolerances as well as eliminating the need for extremely low tidal volumes.

In a meeting held at Fort Totten on 22 June 1966 with Dr. Hustead, it was decided to design and fabricate a universal cycling unit which could be employed to ventilate the range of individual from new born to mature adult. During 3rd Qtr FY 67, a prototype was fabricated to meet new design requirements. In April 1967, the prototype was tested at Mercy Hospital, Kansas City, Missouri, by Dr. Hustead. The unit operated satisfactorily as an open circuit ventilator, but lacked sufficient spill capacity during use in a close circuit anesthesia loop. A new spill valve was designed and a new prototype fabricated. This unit was clinically evaluated by Dr. Lord at the Albert Einstein Medical Center. He requested the addition of an "assist" feature. The Unit was redesigned to include this feature, and the modified unit was Laboratory tested at the University of Kansas Medical Center by Dr. Hustead during June 1968. Increased sensitivity was desired and the unit was again redesigned.

The unit was submitted to Dr. Edgar Yhap, Chief of Anesthesia and Resuscitation, WRAIR. Basic data on the capability of the unit was obtained. It was decided to terminate the ILIR task and complete the development under an officially funded work unit, which was established during December 1970.

Based on previous experience, new novel circuit configurations were developed. To obtain increased sensitivity in the assistor circuit, fluid amplification was inserted between the sensor and the triggering bleeder valve. A new prototype was assembled and subjected to engineering design testing to optimize circuit configurations. A patent (U.S. Pat. 3,556,095) dated 19 January 1971 was granted on the device. In September 1971, at the request of Dr. Hustead, a Positive End Expiratory Pressure Valve was designed and incorporated into the unit.

On 9 October 1971, the Project Engineer visited Dr. Hustead of the University of Kansas Medical Center where a thorough laboratory evaluation of the unit employing simulated loads and recording flow pressure traces was accomplished. During testing, local modification to the breathing circuit were made to improve performance. On 21 October 1971, the ventilator was brought into surgery and used successfully on a patient as an anesthesia ventilator.

On 14 October 1971, the unit was demonstrated to Dr. Mendenhall, Brooke Army Hospital, Department of Anesthesiology, Fort Sam Houston, Texas. Dr. Mendenhall served as a consultant to the Army Surgeon General. Dr. Mendenhall approved basic concept, but requested addition of three features: (1) alarm circuit for accidental patient disconnect; (2) heated humidifier for long time open circuit ventilation; and (3) a means for providing varying air-oxygen mixtures.

During October 1971 an alarm circuit was designed at USAMERDL and incorporated on the prototype. In May 1972 the Project Engineer visited the Medical Research Lab, Edgewood, Maryland, and examined the humidifier (employing copper ribbon in a reflux column arrangement), heated by a 25-50 watt electrical heater, developed previously by Ken Wilson and which could be easily incorporated into the breathing circuit. On 1 June 1972 arrangements were made by Dr. Van Sim and Ken Wilson to have the unit delivered to Dr. Donald Benson, Chief of Anesthesiology at Johns Hopkins Medical School for his evaluation. In December 1972, Dr. Benson summarized his findings in a letter report, indicating that "it works very well in anesthesia, does exactly what is asked of it in spite of changes in compliance and patients. It has been very reliable and all in all we have found it an excellent adjunct for our anesthesia care." No evaluation had been made in the area of intensive care for use on protracted respiration.

In June 1973 a draft proposed ROC was written at USAMBRDL and hand carried to the Academy of Health Sciences, Fort Sam Houston, Texas. On 26 October 1974, the unit was picked up from Dr. Benson, Johns Hopkins, due to his taking a new position at the University of Chicago Medical Center. He confirmed that he found the unit to be a fine anesthesia ventilator, but believed that the controls would be too complex for use by the average technician in recovery rooms. Re-evaluation of the controls is indicated. Dr. Hustead shares Dr. Benson's opinion on controls.

To date no ROC or LR has been released, although USAMBRDL has made comments on proposed documents, as well as a draft Quadripartite Standardization Agreement (American-British-Canadian-Australian) covering "Essential Characteristics of Mechanical Ventilators." Task is presently inactive pending receipt of an official requirements document.

Release of LR has been held in abeyance pending evaluation of a portable volume controlled respirator developed for the U.S. Navy (Contract N61339-75-C-0013 to General Electric Company). USAMBRDL commented on 22 July 1977, on the ability of latter unit to meet the draft LR requirements. Prototypes of the Navy unit are being evaluated at WRAIR and at LAIR.

2. CONCLUSIONS.

A multi-purpose ventilator suitable for field military use is feasible. The ground work for such a unit has been laid, however, redesign will be necessary to obtain simplified controls.

3. RECOMMENDATIONS.

In view of advanced development stage of the U.S. Navy (General Electric Company) unit, it is recommended that evaluation be completed and a joint working group or in-process review conducted after this is accomplished. At this time, the need for the draft LR can be reviewed and the specific required characteristics can be explored in depth.

4. REFERENCES.

a. Proposed In-House R&D Project, MERDL, Title: Field Infant Ventilator.

b. Status Report, letter from Dr. Hustead, dated June 1964.

c. Letter, MERDL, dated 23 December 1968, subject: "Evaluation of Ventilator".

d. Letter, WRAIR, dated 26 November 1969, MEDEC-ZLA, subject: Comparative Evaluation of Resuscitation.

e. Letter, USAMRDC, dated 7 December 1970, MEDDH-MM, subject: "New Work Units under Task No. 3A062110A816.14".

f. Trip Report, USAMERDL, dated 27 October 1971, "Universal Ventilator" visit to University of Kansas and Brooke Army Hospitals.

g. Letter, The Johns Hopkins University, School of Medicine, Division of Anesthesiology, dated December 20, 1972.

h. Letter, USAMBRDL, dated 19 January 1973, SGRD-UBE, subject: "Task No. 816.14.029, Universal Ventilator".

i. 2nd Ind, USAMBRDL, dated 22 July 1977, SGRD-UBE, to letter, HSA-CDM, dated 16 May 1977, subject: "Multipurpose Ventilator, ACN 23342".

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION* DA 0A 6273	2. DATE OF SUMMARY* 77 09 30	REPORT CONTROL SYMBOL DD-DR&E(AR)636
3. DATE PREV SUM'RY 76 10 01	4. KIND OF SUMMARY K. COMPLETION	5. SUMMARY SCTY* U	6. WORK SECURITY* U	7. REGRADING* NA	8a. DISP'N INSTR'N NL	8b. SPECIFIC DATA-CONTRACTOR ACCESS [X] YES [ ] NO	9. LEVEL OF SUM A. WORK UNIT

10. NO./CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62778A	3S762778A838	00	032
XXXXXXXXX	62110A	3A162110A816	00	032
XXXXXXXXX	CARDS 114f			

11. TITLE (Precede with Security Classification Code)*
(U) Pellet Dispersal Unit, Ground Operations

12. SCIENTIFIC AND TECHNOLOGICAL AREAS* 009800 Medical and Hospital Equipment; 002400 Bioengineering; 005900 Environmental Biology

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7504	7706	DA	C. In-House

17. CONTRACT/GRANT
a. DATES/EFFECTIVE: EXPIRATION:
b. NUMBER:*
c. TYPE: d. AMOUNT:
e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR	PRECEDING 7T	0.0	00
	CURRENT 77	0.1	04

19. RESPONSIBLE DOD ORGANIZATION
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NAME:* Driggers, D.P.
TELEPHONE: (301) 663-7237; AUTOVON 343-7237
SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS
NAME: Nelson, J.H.
NAME: POC:DA

21. GENERAL USE
Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Ground Dispersal Unit; (U) Chlorinated Polyethylene Pellets; (U) Mosquito Larvae Control; (U) Pest Management; (U) Pesticide Formulations

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To develop a ground dispersal unit to disseminate chlorinated polyethylene pellets or similar pesticide formulations for controlling mosquito larvae in Army operational areas and on military installations.

24. (U) Review commercial sources for potential equipment. If unsuccessful, design new unit. Evaluate final product for design adequacy and effectiveness as mosquito larvae control system.

25. (U) 7610 - 7709. The Army standard item, sprayer and duster, pesticide, trailer mounted (skid mounted) (NSN: 3740-00-0721) revealed it to be an effective ground dispersal unit for chlorinated polyethylene pellets. A final technical report and a scientific publication of the findings have been prepared.

*Available to contractors upon originator's approval.

DD FORM 1 MAR 68 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A, 1 NOV 65 AND 1498-1, 1 MAR 68 (FOR ARMY USE) ARE OBSOLETE. * U.S. GPO: 1974—540-843/8691

Pellet Dispersal Unit, Ground Operations

3S762778A838.00.032

Detail Sheet

1. Background:

a. This task was established by reference 4a to develop or identify an existing ground unit capable of disseminating chlorinated polyethylene pellets. These pellets are registered (Dursban 10CR® - 10% chlorpyrifos controlled release formulation) for the control of mosquito larvae.

b. Field evaluation of the military standard sprayer and duster gave most satisfactory results. Data concerning this piece of equipment is listed below.

(1) Nomenclature: Sprayer and Duster, Pesticide, Trailer Mounted (Skid Mounted)

(2) NSN: 3740-00-901-0721

(3) Line Item No.: U10774

(4) Cost: $7883.00

c. A technical report (4c) and a scientific publication (4d) of the findings have been prepared.

2. Conclusions:

The Buffalo Turbine Turbulent Air Sprayer and Duster [Military Nomenclature: Sprayer and Duster, Pesticide, Trailer Mounted, (Skid Mounted), NSN: 3740-00-901-0721] is a satisfactory unit for dispersal of the chlorinated polyethylene formulation Dursban 10-CR®.

3. Recommendations:

a. That the military standard item, Sprayer and Duster, Pesticide, Trailer Mounted, (Skid Mounted) NSN: 3740-00-901-0721 be identified as a unit suitable for application of the chlorinated polyethylene formulation Dursban 10-CR®.

b. That this work unit be identified as complete.

4. References:

a. DA Form 200 HQDA(SGRD-RP) to USAMBRDL dated 1 May 1975, subject: Approval of DA OA 6273A. New 816.00.32 "Pellet Dispersal Unit, Ground Operations".

Pellet Dispersal Unit, Ground Operations cont'd

b. Report, USAEHA-RE/WP dated 17 December 1974, subject: Entomological Special Study No. 44-022-73/75, Field Evaluation of the Larvicidal Effectiveness, Effects on Nontarget Species and Environmental Residues of a Slow-Release Polymer Formulation of Chlorpyrifos, March-October 1973.

c. USAMBRDL Report TR 7614, Pellet Dispersal Unit, Ground Operations (ADA 036897), April 1975 - December 1976.

d. Scientific Publication - Identification of a Suitable Ground Operated Unit for Dispersal of Dursban® 10 CR, Journal of the American Mosquito Control Association 37(2): 296-98, June 1977.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA 0B 6154	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
77 03 10	D. CHANGE	U	U	NA	NL	☒ YES ☐ NO	A. WORK UNIT

10. NO. CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62778A	3S691000A838	00	035
b. CONTRIBUTING				
XXXXXXXXX	CARDS 114f			

11. TITLE (Precede with Security Classification Code)*

(U) Applied Research Effort for Mosquito Control in Dredge Disposal Areas

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

005900 Environmental Biology; 002600 Biology; 002400 Bioengineering

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7703	7712	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 77	0.3	12
FISCAL YEAR CURRENT 78	0.0	03

19. RESPONSIBLE DOD ORGANIZATION

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20. PERFORMING ORGANIZATION

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SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Driggers, D.P.

NAME: Desrosiers, R.E. POC:DA

21. GENERAL USE

Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Dredge Disposal Areas; (U) Pest Management; (U) Mosquito Control; (U) Pesticide; (U) Controlled-Release Larvicide

23. TECHNICAL OBJECTIVE.* 24. APPROACH. 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To conduct applied research essential to determine the feasibility of long-range mosquito control within selected diked disposal areas adjacent to the Atlantic Intracoastal Waterway, through the use of a controlled-release formulation of chlorpyrifos (i.e., Dursban 10 CR).

24. (U) Pre-treatment surveys will be made of four dredged material areas (out of a total of 50) to determine larval mosquito species diversity and population densities. Application of Dursban 10 CR would then be made with an appropriate backpack unit, in accordance with label instructions with strict attention given to human and environmental safety. Post-treatment natural larval mosquito population densities will be checked weekly for the first 4 weeks, then monthly during the mosquito breeding season for a period of 1 year, and thereafter on a quarterly basis until the area is refilled. Water samples for selected sites around the outside perimeter of each dredged material area will be collected and analyzed for pesticide residues using GLC methods.

25. (U) 7703 - 7709. Applications of Dursban 10 CR were made on selected mosquito breeding sites utilizing two backpack dispersal units. Results of these tests as determined by programmed monitoring visits indicate that Dursban 10 CR applications are completely effective in reducing and/or totally eliminating mosquitoes from the disposal areas. A final technical report is being prepared.

*Available to contractors upon originator's approval.

DD FORM 1 MAR 68 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A, 1 NOV 65 AND 1498-1, 1 MAR 68 (FOR ARMY USE) ARE OBSOLETE. * U.S. GPO: 1974—560-843/8691

Applied Research Effort for Mosquito Control
in Dredge Disposal Areas

3S691000A838.00.035

Detail Sheet

1. Background:

Historically, the Corps of Engineers has disposed of dredged materials by discharge directly onto the banks within the intercoastal waterways system. Severe criticisms voiced by various environmental groups concerning this practice have resulted in the construction of confined disposal areas throughout the intercoastal waterway system in order to contain dredged materials.

When dredged material is pumped into the disposal areas, (usually on a 18-24 mo. cycle) the suspended material is allowed to settle out and the overlying water is drained off. The disposal areas then become entirely contained subject only to occasional incomplete inundation by rainfall. These rainfall and drying cycles throughout the year cause large, deep cracks to form within the dredged material which become exceptionally productive breeding areas for mosquitoes.

Previous mosquito control within the dredged materials areas in North Carolina has been restricted to the use of Flit MLO as a larvicide. Due to the limited duration of effectiveness of this compound, frequent reapplications throughout each year's breeding season make this method of control quite expensive. A commitment of funds by the Wilmington, NC District Corps of Engineers is made each year directly to the affected County Mosquito Control Agencies.

The District Corps of Engineers at Wilmington, NC has requested that the US Army Medical Bioengineering Research and Development Laboratory (USAMBRDL), Fort Detrick, MD, consider undertaking a research project to determine the feasibility of long-range mosquito control within the confined dredged materials areas, through use of a controlled-release formulation of chlorpyrifos (i.e. Dursban 10 CR).

Besides the obvious results to be obtained, such a research endeavor would also enable USAMBRDL to fulfill obligations for evaluation of a solid pesticide backpack for use by TOE units in accordance with the request from CDR, Medical R&D Command, dated 21 June 1976.

2. Conclusions:

Applications of Dursban 10 CR were made on selected mosquito breeding sites utilizing 2 backpack dispersal units. Results of these tests as determined by programmed monitoring visits indicate that Dursban 10 CR applications are completely effective in reducing and/or totally eliminating mosquitoes from the disposal areas.

Applied Research Effort for Mosquito Control in Dredge Disposal Areas cont'd

3. Recommendations:

Prepare a technical report.

4. References:

a. Letter, SAWCO-NI to SGRD-SDM, dated 22 Nov 76, subject: Request for Applied Research Effort by US Army Medical Bioengineering R&D Laboratory (USAMBRDL) to Determine Feasibility of Long-Range Mosquito Control in Diked Disposal Areas.

b. Letter (1st Ind), DA-USAMRDC to USAMBRDL, dated 4 Dec 76, subject: as above.

c. Letter, USAMBRDL to HQDA(SGRD-SDM), dated 10 Dec 76, subject as above.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA 0B 6156	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
76 10 01	D. CHANGE	U	U	NA	NL	☒ YES ☐ NO	A. WORK UNIT

10. NO. CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62778A	3S762778A838	00	039
XXXXXXXXX	62110A	3A162110A816	00	039
XXXXXXXXX	CARDS 114f			

11. TITLE (Precede with Security Classification Code)*

(U) Utility Unit, Dental Operating, Field

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

009800 Medical and Hospital Equipment; 002400 Bioengineering

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7507	7809	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER*

c. TYPE d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 77	0.1	02
FISCAL YEAR CURRENT 78	0.3	15

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

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21. GENERAL USE

Foreign Intelligence Not Applicable

20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

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PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

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SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: O'Connor, R.J.

NAME: POC:DA

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Dental Portable Equipment; (U) Dental Field Equipment; (U) Dental Field Systems; (U) Dental Operating Unit

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To develop a dental utility unit which will provide field dental personnel with a self-contained, pressurized water supply and evacuation system for use in support of electrically powered dental operating and prophylaxis handpiece systems.

24. (U) Design and fabricate a utility unit and clinically evaluate it in conjunction with the electrically powered handpiece systems.

25. (U) 7610 - 7709. A new double-ended pump and a larger air/water tank have been obtained and incorporated into the design and evaluated. A complete design incorporating housing, supports, suction waste container is currently being investigated.

*Available to contractors upon originator's approval.

UTILITY UNIT, DENTAL OPERATING, FIELD

3S762778A838.00.039

Detail Sheet

1. BACKGROUND.

This task was established to develop a field piece of equipment that will reduce the need for a large air compressor. The aim is to utilize electrically powered hand pieces and small self-contained pressurized water supply and evacuation system.

2. CONCLUSIONS.

Development is technically feasible and a new double-ended pump proved successful.

3. RECOMMENDATIONS.

Continue development to a successful conclusion.

4. REFERENCES.

Letter, SGRD-SDD, dated 3 July 1975.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA OB 6185	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISS'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
76 10 01	D. CHANGE	U	U	NA	NL	☒ YES ☐ NO	A. WORK UNIT

10 NO CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62778A	3S762778A838	00	040
b. CONTRIBUTING				
XXXXXXXXX	CARDS 114f			

11. TITLE (Precede with Security Classification Code)*

(U) Field Medical Devices and Laboratory Equipment

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

009800 Medical and Hospital Equipment; 010100 Microbiology

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7610	7910	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 77	5.3	200
FISCAL YEAR CURRENT 78	0.6	37

19. RESPONSIBLE DOD ORGANIZATION

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20. PERFORMING ORGANIZATION

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SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Pace, R.R.

NAME: Salisbury, L.L. POC:DA

21. GENERAL USE

Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code)

(U) Laboratory Equipment; (U) Medical Field Devices; (U) Test Kits

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To develop through exploratory studies field medical devices and laboratory equipment to be available to Army field medical units.

24. (U) Exploratory development studies to determine required lightweight self-contained modular equipment elements needed to measure homeostatic variables in forward areas. Equipment is designed to be self-contained, field maintainable and capable of operating in all environments. Initial efforts will be oriented toward blood chemistry.

25. (U) 7610 - 7709. A self-calibrating, microprocessor controlled device capable of measuring glucose, direct and total bilirubin, creatine, and BUN has been constructed. Programming of microprocessor is now being completed.

*Available to contractors upon originator's approval.

Field Medical Devices and Laboratory Equipment

3S762778A838.00.040

Detail Sheet

1. Background:

The purpose of this task is to develop reliable, lightweight modular equipment for use in field medical units. More specifically, the clinical laboratory has been targeted with initial efforts being directed toward development of a blood chemistry machine. A continuous flow colormetric technique was selected.

Sampling, heating, dializer, pump, optical, power, microprocessor, and input/output sub-systems have been satisfactorily completed.

Chemical reaction and standardization sub-systems are complete but have shortcomings.

Software and final system integration remain to be finished.

2. Conclusions:

Field clinical analysis equipment is urgently needed, although specific requirements are uncertain as is the optimum technique for attaining them.

3. Recommendations:

Remaining development should be completed and in-house testing and a clinical evaluation should be conducted. A well recognized clinical laboratory consultant should be obtained.

Requirements for the system should be established.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA 0B 6190	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISB'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
76 10 01	D. CHANGE	U	U	NA	NL	☒ YES ☐ NO	A. WORK UNIT

10 NO CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62778A	3S762778A838	00	041
b. CONTRIBUTING				
XXXXXXXXG	CARDS 114f			

11. TITLE (Precede with Security Classification Code)*

(U) Pesticide Dispersal Unit, Solid, Helicopter Slung

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

009800 Medical and Hospital Equipment; 002400 Bioengineering

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7610	7709	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR	PRECEDING 77	0.8	30
	CURRENT 78	1.0	50

19. RESPONSIBLE DOD ORGANIZATION

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TELEPHONE: (301) 663-7237; AUTOVON 343-7237

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Cranford, H.B.

NAME: Hembree, S.C. POC:DA

21. GENERAL USE

Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Helicopter Rig; (U) Solid Dispersal; (U) Aerial Applications; (U) Mosquito Control; (U) Solid Insecticide

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To identify a suitable commercial, helicopter slung, dispersal unit for applying solid formulations of insecticides, which would: (a) be capable of dispersing insecticides when slung beneath a helicopter; (b) require no modification of the aircraft; (c) be capable of applying adequate swath widths and deposition rates for controlling disease vectors in combat situations or CONUS.

24. (U) A Simplex helicopter rig, manufactured by Simplex Corporation, Portland, Oregon has been purchased and will be evaluated with a variety of formulations under a variety of ecological conditions. After entomological feasibility has been established, necessary modifications will be made and flight qualification tests coordinated with USAAVSCOM.

25. (U) 7610 - 7709. The Simplex spreader was found to be feasible. Modifications were completed and the unit was field tested in the Canal Zone. Further modification refinements are being made and the unit will be submitted as a replacement item for the current line item number.

*Available to contractors upon originator's approval.

Pesticide Dispersal Unit, Solid, Helicopter Slung

3S762778A838.00.041

Detail Sheet

1. Background:

A commercial, helicopter slung fertilizer spreader was purchased by USAMRDC and field evaluated by USAMBRDL at Military Ocean Terminal, Sunny Point, NC. Initial results showed feasibility of the unit for military use in mosquito larval control operations. A solid sand-coated formulation of Altosid, a developmental inhibitor, was tested in the unit. Good distribution of formulation and mosquito control was demonstrated in the evaluation. The unit was modified and field tested in the Canal Zone using a pelletized pesticide formulation. These tests were successful and modification refinements are underway.

2. Conclusions:

The commercial aerial spreader has demonstrated the necessary potential as a larval mosquito control unit for military field operations.

3. Recommendations:

That further evaluation of the unit be undertaken in FY78 to determine its ability to disperse a variety of solid formulations under actual field conditions.

4. References:

a. DF, DASG-HCL to USAMRDC, dated 4 June 1976, subject: Vector Control and Pesticide Dispersal Equipment.

b. Letter, SGRD-SDM to USAMBRDL, dated 21 June 1976, subject: as above.

c. Letter, USAMBRDL (SGRD-UBH) to USAMRDC, dated 23 Aug 76, subject: as above.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA 0B 6191	77 09 30	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
76 10 01 H	TERMINATION	U	U	NA	NL	[X] YES [ ] NO	A. WORK UNIT

10. NO CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62778A	3S762778A838	00	042
b. CONTRIBUTING				
XXXXXXXXX	CARDS 114f			

11. TITLE (Precede with Security Classification Code)*

(U) Duster, Manual, Backpack

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

009800 Medical and Hospital Equipment; 002400 Bioengineering

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7610	7709	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING	7T	0.0	00
FISCAL YEAR CURRENT	77	0.0	01

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

NAME: Dettor, C.M., COL

TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* Driggers, D.P.

TELEPHONE: (301) 663-7237; AUTOVON 343-7237

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Cranford, H.B.

NAME: Nelson, J.H. POC:DA

21. GENERAL USE

Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Duster; (U) Manual; (U) Backpack; (U) Arthropod Control; (U) Disease Vectors; (U) Durable; (U) Lightweight

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To identify a commercially available, lightweight, durable, manually-operated backpack unit capable of dispensing various dust formulations. This unit would be used by preventive medicine personnel in combat zones and CONUS for controlling disease vectors and pest arthropods.

24. (U) A review of commercially available backpack units will be made. Suitable units will be field evaluated. After entomological feasibility has been established, modifications, if necessary, will be made and formal testing coordinated with responsible agencies.

25. (U) 7610 - 7709. No commercially available manual backpack dusters could be identified. Several motorized backpack dispersal units which fulfill the requirement of dispensing dust have been identified in conjunction with another ongoing work unit. This work unit is being terminated and the requirements and resources are being integrated into the ongoing work unit, Portable Pesticide Dispersal Equipment, 3S762778A838.00.044.

*Available to contractors upon originator's approval.

Duster, Manual, Backpack

3S762778A838.00.042

Detail Sheet

1. Background:

A review by the SGO, of the available pesticide dispersal units, ground and air, has revealed that the mission of the Preventive Medicine Team LA, Entomology Service (TOE 8-620H) may be severely impaired by the lack of this dispersal equipment. A requirement, initiated by the SGO, was sent to USAMRDC and ultimately to USAMBRDL for action to initiate a series of tasks on a priority basis to correct these deficiencies. The duster, manual, backpack is one of these tasks.

2. Conclusions:

That the requirements established for this work unit will be satisfied by the related task, Portable Pesticide Dispersal Equipment, 3S762778A838.00.044.

3. Recommendations:

That this task be terminated and the requirement and resources be integrated into the ongoing work unit - Portable Pesticide Dispersal Equipment.

4. References:

a. DF, DASG-HCL to USAMRDC, dated 4 June 1976, subject: Vector Control and Pesticide Dispersal Equipment.

b. Letter, SGRD-SDM to USAMBRDL, dated 21 June 1976, subject: as above.

c. Letter, USAMBRDL (SGRD-UBH) to USAMRDC, dated 23 Aug 76, subject: as above.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA OB 6192	77 09 30	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISB'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
76 10 01	H. TERMINATION	U	U	NA	NL	[X] YES [ ] NO	A. WORK UNIT

10. NO. CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62778A	3S762778A838	00	043
b. CONTRIBUTING				
XXXXXXXXX	CARDS 114f			

11. TITLE (Precede with Security Classification Code)*

(U) Sprayer, Hand Portable, Ultra Low Volume (ULV)

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

009800 Medical and Hospital Equipment; 002400 Bioengineering

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7610	7709	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 7T	0.0	00
FISCAL YEAR CURRENT 77	0.0	00

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering
ADDRESS:* Research & Development Laboratory
Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL
NAME: Dettor, C.M., COL
TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering
ADDRESS:* Research & Development Laboratory
Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)
NAME:* Driggers, D.P.
TELEPHONE: (301) 663-7237; AUTOVON 343-7237
SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS
NAME: Cranford, H.B.
NAME: Nelson, J.H. POC:DA

21. GENERAL USE

Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Sprayer; (U) Hand Portable; (U) ULV; (U) Mosquito Control; (U) Lightweight; (U) Durable

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To identify a commercially available, lightweight, durable hand portable ULV unit for use by preventive medicine personnel in combat zones and CONUS for controlling adult mosquitoes and other medically important flying insects.

24. (U) A review of commercially available backpack units will be made. Suitable units will be field evaluated. After entomological feasibility has been established, modifications, if necessary, will be made and formal testing coordinated with responsible agencies.

25. (U) 7610 - 7709. It has been determined that several liquid/solid motorized backpack pesticide dispersal units currently under evaluation are capable of fulfilling the requirements established for this specific piece of equipment. This work unit is being terminated and the requirements and resources are being integrated into the ongoing work unit, Portable Pesticide Dispersal Equipment 3S762778A838.00.044.

*Available to contractors upon originator's approval.

Sprayer, Hand Portable, Ultra Low Volume (ULV)

3S762778A838.00.043

Detail Sheet

1. Background:

A review by the SGO, of the available pesticide dispersal units, ground and air, has revealed that the mission of the Preventive Medicine Team LA, Entomology Service (TOE 8-620H) may be severely impaired by the lack of this dispersal equipment. A requirement, initiated by the SGO was sent to USAMRDC and ultimately to USAMBRDL for action to initiate a series of tasks on a priority basis to correct these deficiencies. The sprayer, hand portable, ULV is one of these tasks.

2. Conclusions:

That the requirements established for this work unit will be satisfied by the related task, Portable Pesticide Dispersal Equipment, 3S762778A838.00.044.

3. Recommendations:

That this task be terminated and the requirements and resources be integrated into the ongoing work unit - Portable Pesticide Dispersal Equipment.

4. References:

a. DF, DASG-HCL to USAMRDC, dated 4 June 1976, subject: Vector Control and Pesticide Dispersal Equipment.

b. Letter, SGRD-SDM to USAMBRDL, dated 21 June 1976, subject: as above.

c. Letter, USAMBRDL (SGRD-UBH) to USAMRDC, dated 23 Aug 76, subject: as above.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA 0B 6193	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
76 10 01	D. CHANGE	U	U	NA	NL	[X] YES [ ] NO	A. WORK UNIT

10. NO. CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62778A	3S762778A838	00	044
b. CONTRIBUTING				
XXXXXXXXX	CARDS 114f			

11. TITLE (Precede with Security Classification Code)*

(U) Portable Pesticide Dispersal Equipment

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

009800 Medical and Hospital Equipment; 002400 Bioengineering

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7610	8010	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 77	0.8	24
FISCAL YEAR CURRENT 78	1.3	40

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

NAME: Dettor, C.M., COL

TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* Gula, P.R.

TELEPHONE: (301) 663-7237; AUTOVON 343-7237

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Driggers, D.P.

NAME: Nelson, J.H. POC:DA

21. GENERAL USE

Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Backpack; (U) Solid/Liquid Dispersal; (U) Arthropod Control; (U) Lightweight; (U) Durable; (U) Disease Vectors; (U) Portable

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To identify a commercially available, lightweight, durable, backpack unit capable of dispersing solid or liquid pesticide formulations. This unit would be used by preventive medicine personnel in combat zones and CONUS for controlling disease vectors and pest arthropods.

24. (U) A review of commercially available backpack units will be made. Suitable units will be field evaluated. After entomological feasibility has been established, modifications, if necessary, will be mde and formal testing coordinated with responsible agencies.

25. (U) 7610 - 7709. Seven commercially available portable backpack pesticide dispersal units have been identified, procured and are being evaluated for military applicability.

*Available to contractors upon originator's approval.

Portable Pesticide Dispersal Equipment

3S762778A838.00.044

Detail Sheet

1. Background:

a. A review by the SGO, of the available pesticide dispersal units, ground and air, has revealed that the mission of the Preventive Medicine Team LA, Entomology Service (TOE 8-620H) may be severely impaired by the lack of this dispersal equipment. A requirement, initiated by the SGO, was sent to USAMRDC and ultimately to USAMBRDL for action to initiate a series of tasks on a priority basis to correct these deficiencies. The pesticide dispersal unit, solid/liquid backpack is one of these tasks.

b. The requirements and resources for two other work units generated in conjunction with this work unit have been integrated into this work unit. This work unit has subsequently been redesignated Portable Pesticide Dispersal Equipment.

c. The three work units which have been integrated into this task are:

(1) Duster, Manual, Backpack - 3S762778A838.00.042

(2) Sprayer, Hand Portable, Ultra Low Volume (ULV) - 3S762778A838.00.043

(3) Pesticide Dispersal Unit, Liquid/Solid Backpack -3S762778A838.00.044

d. Currently seven commercially available portable backpack pesticide dispersal units have been identified, procured and are being evaluated for military applicability and durability. Bench and field evaluations are approximately 20% complete.

2. Conclusions:

A satisfactory unit will be identified at the conclusion of these evaluations.

3. Recommendations:

That this work unit be maintained in the 838 program for the current fiscal year, and moved into the 836 or 832 program area during FY79.

4. References:

a. DF, DASG-HCL to USAMRDC, dated 4 June 1976, subject: Vector Control and Pesticide Dispersal Equipment.

b. Letter, SGRD-SDM to USAMBRDL, dated 21 June 1976, subject: as above.

c. Letter, USAMBRDL(SGRD-UBH) to USAMRDC, dated 23 Aug 76, subject: as above.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA 0B 6195	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISB'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
76 10 01	D. CHANGE	U	U	NA	NL	☒ YES ☐ NO	A. WORK UNIT

10. NO. CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62778A	3S762778A838	00	045
b. CONTRIBUTING				
XXXXXXXXX	CARDS 114f			

11. TITLE (Precede with Security Classification Code)*

(U) Pesticide Dispersal Unit, Liquid, Helicopter Slung

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

009800 Medical and Hospital Equipment; 002400 Bioengineering

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7610	7709	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 77	0.1	07
FISCAL YEAR CURRENT 78	1.5	70

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

NAME: Dettor, C.M., COL

TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* Nelson, J.H.

TELEPHONE: (301) 663-7237; AUTOVON 343-7237

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Cranford, H.B.

NAME: Hembree, S.C. POC:DA

21. GENERAL USE

Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Helicopter Rig; (U) Liquid Dispersal; (U) Aerial Application; (U) Mosquito Control; (U) Liquid Insecticide

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To identify a suitable commercial, helicopter slung, dispersal unit for applying liquid formulations of insecticides, which would: (a) be capable of dispensing liquid insecticides when slung beneath a helicopter; (b) require no modification of the aircraft; (c) be capable of applying adequate swath widths and deposition rates for controlling disease vectors in combat situations or CONUS.

24. (U) A survey of commercially available, helicopter slung rigs will be made. Suitable units will be field evaluated. After entomological feasibility has been established, necessary modifications will be made and flight qualification tests coordinated with USAAVSCOM.

25. (U) 7610 - 7709. The Simplex Model 2000 Liquid Spray Bucket available from Simplex Manufacturing Co., Portland, OR was identified as a suitable candidate to accomplish the objective. A unit has been procured and modification evaluations are being conducted.

*Available to contractors upon originator's approval.

Pesticide Dispersal Unit, Liquid, Helicopter Slung

3S762778A838.00.045

Detail Sheet

1. Background:

A review by the SGO, of the available pesticide dispersal units, air and ground, has revealed that the mission of the Preventive Medicine Team LA, Entomology Service (TOE 8-620H) may be severely impaired by the lack of this dispersal equipment. A requirement, initiated by the SGO was sent to USAMRDC and ultimately to USAMBRDL for action to initiate a series of tasks to correct these deficiencies. The pesticide dispersal unit, liquid, helicopter slung is one of the tasks.

2. Conclusions:

A potentially suitable unit has been identified and procured. Modification evaluations are underway.

3. Recommendations:

This work should be continued as a high priority task during FY78.

4. References:

a. DF, DASG-HCL to USAMRDC, dated 4 June 1976, subject: Vector Control and Pesticide Dispersal Equipment.

b. Letter, SGRD-SDM to USAMBRDL, dated 21 June 1976, subject: as above.

c. Letter, USAMBRDL (SGRD-UBH) to USAMRDC, dated 23 Aug 76, subject: as above.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA 0B 6196	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISB'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
76 10 01	D. CHANGE	U	U	NA	NL	☒ YES ☐ NO	A. WORK UNIT

10. NO CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62778A	3S762778A838	00	046
b. CONTRIBUTING				
XXXXXXXXX	CARDS 114f			

11. TITLE (Precede with Security Classification Code)*

(U) Development of a Water Purification Unit and Field Test for Pyrogen Free Water

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

002300 Biochemistry; 012100 Organic Chemistry; 009800 Medical and Hospital Equipment

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7607	7810	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 77	0.2	07
FISCAL YEAR CURRENT 78	1.2	62

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

NAME: Dettor, C.M., COL

TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* Barkley, J.J.

TELEPHONE: (301) 663-2036; AUTOVON 343-2036

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME:

NAME:

21. GENERAL USE

Foreign Intelligence Not Applicable

POC:DA

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Endotoxins; (U) Production of; (U) Assay for; (U) Pyrogen Free Water; (U) Pharmacy

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To develop a water purification unit to be used within the Medical Unit Self-Contained Transportable (MUST) Pharmacy Module capable of producing waters for injection that meet United States Pharmacopeia Standards. To develop or adapt existing test procedures that are capable of verifying the quality of the water produced.

24. (U) Existing <u>in vitro</u> assays for the determination of pyrogens in parenteral solutions will be evaluated for use under field conditions. After development of an assay method, a simple, low maintenance water purification unit capable of producing pyrogen-free water will be developed for use in the MUST Pharmacy Module and other MUST hospital units. A method for packaging individual 1-liter containers will be developed.

25. (U) 7610 - 7709. A detailed literature search was completed and a problem definition document is being prepared for publication.

*Available to contractors upon originator's approval.

DEVELOPMENT OF A WATER PURIFICATION UNIT AND
FIELD TEST FOR PYROGEN FREE WATER

3S762778A838.00.046

Detail Sheet

1. Background

Due to a lack of capability of requirement was established for the production of pyrogen-free water for irrigations and injections in the MUST Pharmacy Module. In conjunction with this a requirement exists to verify that the water produced can meet FDA criteria for apyrogenicity.

2. Conclusions

None

3. Recommendations

Initiate study based on literature search data, which includes the use of ion-exchange, carbon absorption and UV-ozone treatment of drinking water. Also the findings of the literature search indicate that the Limulus Amebocyte Lysate (LAL) is capable of determining the apyrogenicity of water under the anticipated MUST field conditions.

4. References

Letter, SGRD-SDM, dated 21 June 1976.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA OB 6215	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISB'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
77 04 29	D. CHANGE	U	U	NA	NL	X YES ☐ NO	A. WORK UNIT

10. NO CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62778A	3S762778A838	00	047
b. CONTRIBUTING				
XXXXXXXX ING	CARDS 114f			

11. TITLE (Precede with Security Classification Code)*

(U) Bag, Aidman's, Redesign of

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

002400 Bioengineering; 009800 Medical & Hospital Equipment

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7705	7812	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR	PRECEDING 77	0.2	06
	CURRENT 78	0.5	20

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

NAME: Dettor, C.M., COL

TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* Altman, R.G.

TELEPHONE (301) 663-2835; AUTOVON 343-2835

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: O'Connor, R.J.

NAME: POC:DA

21. GENERAL USE

Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Air Bag; (U) Aidman; (U) Emergency Medical Treatment; (U) Field Medical Equipment; (U) Case, Medical Instrument and Supply

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To develop an improved aid bag for use by the platoon aidman.

24. (U) Functional criteria for aid bags will be established. Several potential replacements will be designed, fabricated and evaluated. The best features of each model will be incorporated into a final design.

25. (U) 7704 - 7709. Functional criteria for aid bags has been established. Four models have been designed and are now being built.

*Available to contractors upon originator's approval

Bag, Aidman's, Redesign Of

3S762778A838.00.047

Detail Sheet

1. Background:

As a result of numerous complaints and suggestions concerning the present M-3 and M-5 aid bags, on 29 April 1977 a project was initiated to develop an improved bag for the platoon aidman.

NARADCOM was contacted to determine current trends in personnel equipment. Based on their recommendations and on information gathered during liaison visits and in-house conferences, a set of functional criteria has been established.

Preliminary design of several conceptual approaches was accomplished and procurement-of materials was initiated.

The first of several conceptual models has been fabricated.

2. Conclusions:

It will be possible to considerably improve the present aid bags and aidman's kit.

3. Recommendations:

A requirement document for this work should be developed.

Further development and test should proceed immediately due to the need and impact of this piece of equipment.

4. References:

a. Letter SGRD-SDM, 22 Mar 77, subject: M-5 Aid Kit Modification.

b. Report of Visit, 7 Jun 77 to NARADCOM by Mr. O'Connor and 2LT Altman.

c. Memorandum for Record, 17 Mar 77, subject: Aid Bag Contents Based on Meeting of Aidmen at USAMBRDL 14 Mar 77.

d. Memorandum for Record, 2 Aug 77, subject: Meeting on Aid Bag Contents 27 Jul 77 at USAMBRDL.

e. Memorandum for Record, 18 Mar 77, subject: Initial Standards for Aid Bags.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA OB 6054	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
76 10 01	D. CHANGE	U	U	NA	NL	☒ YES ☐ NO	A. WORK UNIT

10. NO. CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62778A	3S762778A838	00	101
~~XXXXXXXXX~~	62110A	3A162110A816	00	101
~~XXXXXXXXX~~	CARDS 114f			

11. TITLE (Precede with Security Classification Code)*

(U) Concentrator, Mosquito Larvae

12. SCIENTIFIC AND TECHNOLOGICAL AREAS* 009800 Medical and Hospital Equipment; 002400 Bioengineering; 005900 Environmental Biology

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7504	7712	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 77	0.3	08
FISCAL YEAR CURRENT 78	0.2	10

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

NAME: Dettor, C.M., COL

TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* Driggers, D.P.

TELEPHONE: (301) 663-7237; AUTOVON 343-7237

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Cranford, H.B.

NAME: Desrosiers, R.E. POC:DA

21. GENERAL USE

Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Larval Concentrator; (U) Mosquito Surveys; (U) Disease Vectors; (U) Population Studies; (U) Mosquito Habitats

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To develop a mosquito larval concentrator for use in mosquito larvae surveys for determination of population densities of potential disease vectors or pest mosquitoes that affect the health and morale of military and associated populations in CONUS and at overseas locations.

24. (U) Design and fabricate prototype concentrators and evaluate.

25. (U) 7610 - 7709. Final prototype mosquito larvae concentrators have been fabricated and developmental field evaluations have been conducted. Prototype units have been assembled and are being sent to identified user agencies for evaluation. A technical report and a scientific publication are being prepared.

*Available to contractors upon originator's approval.

Concentrator, Mosquito Larvae

3S762778A838.00.101

Detail Sheet

1. Background:

a. A requirement was established by reference listed at 4a to develop a portable, break resistant, mosquito larvae concentrator for use during field mosquito larval surveys.

b. Initial prototypes were fabricated and field tested for efficacy. Engineering design drawings were also completed.

c. Close examination of initial prototypes and the results of developmental testing revealed several unsatisfactory characteristics of the initial prototypes.

d. The concentrator and its collecting vials were re-engineered to produce a more durable, sturdy, one-piece concentrator unit with a simplified collection system. All components of this prototype are standard, easily obtainable items which require considerably less hand tooling and machining to produce.

e. Initial developmental testing has been conducted with the new prototypes. Developmental field evaluations have proven the item to be satisfactory.

2. Conclusions:

The new prototype will satisfy the requirement as outlined in reference 4a.

3. Recommendations:

a. That additional prototypes be fabricated to be sent out for developmental testing in the field by the primary users.

b. That the task, "Concentrator, Mosquito Larvae" be continued.

c. That relevant information concerning this concentrator be published in an appropriate professional entomological journal.

d. That a Technical Report be prepared at the completion of this task.

4. References:

a. Letter, SGRD-SDM to USAMBRDL dated 31 March 1975, subject: Proposed Entomological Tasks.

b. Minutes, DRB Meeting No. 76-7, SGRD-UBE dated 29 January 1976, subject: Materiel Developmental Review Board.

c. Memorandum, USAMBRDL Engineering Evaluation Branch to Pest Management Systems Branch, dated 2 March 1976, subject: Developmental Test (DT-I) of Concentrator, Mosquito Larvae, Task No. 816.00.101.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA 0B 6057	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISB'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
76 10 01	D. CHANGE	U	U	NA	NL	[X] YES [ ] NO	A. WORK UNIT

10. NO./CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62778A	3S762778A838	00	104
XXXXXXXXX	62110A	3A162110A816	00	104
XXXXXXXXX	CARDS 114f			

11. TITLE (Precede with Security Classification Code)*

(U) Light Trap, Portable, Mosquito

12. SCIENTIFIC AND TECHNOLOGICAL AREAS* 009800 Medical and Hospital Equipment; 002400 Bioengineering; 005900 Environmental Biology

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7504	7809	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 77	1.3	52
FISCAL YEAR CURRENT 78	0.5	20

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

NAME: Dettor, C.M., COL

TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* Driggers, D.P.

TELEPHONE: (301) 663-7237; AUTOVON 343-7237

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: O'Connor, R.J.

NAME: Schiefer, B.A. POC:DA

21. GENERAL USE

Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Mosquito Light Trap; (U) Disease Vectors; (U) Pest Mosquitoes; (U) Mosquito Surveys; (U) Population Studies

23. TECHNICAL OBJECTIVE.* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To develop a portable battery-operated mosquito light trap for use in disease vector and pest mosquito surveys. This will replace the standard light trap set (NSN: 6545-00-3766) which has proven unsatisfactory for field use.

24. (U) Design and fabricate a suitable portable mosquito light trap and conduct field evaluation in various habitats.

25. (U) 7610 - 7709. Two prototype solid state traps equipped with a light activated control switch have been developed and field evaluated. The new system has proven satisfactory and is superior to the initial prototypes developed during FY76.

*Available to contractors upon originator's approval.

DD FORM 1 MAR 68 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A, 1 NOV 65 AND 1498-1, 1 MAR 68 (FOR ARMY USE) ARE OBSOLETE.

Light Trap, Portable, Mosquito

3S762778A838.00.104

Detail Sheet

1. Background:

a. A work unit was established by reference 4a to develop a durable, lightweight portable mosquito light trap to replace the Army standard light trap set (NSN: 6545-00-089-3766) which has proven unsatisfactory for field use.

b. Traps will be utilized by the following:

(1) Preventive Medicine Detachments (TO&E 8-620H).

(2) Health Service Command (HSC) post medical activities (MEDDAC), health and environment sections.

(3) US Army Environmental Hygiene Agency (USAEHA) regional activities.

(4) US Army Medical Laboratories.

(5) US Army Medical Research and Development Command (USAMRDC) research activities.

(6) Academy of Health Sciences (AHS).

(7) Facility Engineer, Entomology Services Section.

2. Conclusions:

The newly developed USAMBRDL solid state portable mosquito light trap is equivalent to the previously developed Army improved mosquito light trap, and vastly superior to the CDC mosquito light trap. Additionally, the flexibility of having the trap equipped with a switch controlled by existing light will allow much flexibility in the deployment of the system and result in a substantial savings of time and manpower.

3. Recommendations:

a. That the trap be tested in a tropical environment.

b. That the basic design be fixed.

Light Trap, Portable, Mosquito cont'd

4. References:

a. Letter, SGRD-SDM to USAMBRDL dated 31 March 1975, subject: Proposed Entomological Tasks.

b. Report, MEDEC-ZFB to HQDA(DASG-HEP-D) dated 27 October 1971, subject: VEE Surveillance Team Final Report.

c. Minutes, DRB Meeting No. 76-7, SGRD-UBE, dated 29 January 1976, subject: Materiel Development Review Board.

d. Letter, ALBO-E to USAMBRDL dated 11 July 1973, subject: Improvement of Mosquito Light Trap Set.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION* DA 0B 6058	2. DATE OF SUMMARY* 77 10 01	REPORT CONTROL SYMBOL DD-DR&E(AR)636
3. DATE PREV SUM'RY 76 10 01	4. KIND OF SUMMARY D. CHANGE	5. SUMMARY SCTY* U	6. WORK SECURITY* U	7. REGRADING* NA	8a. DISB'N INSTR'N NL	8b. SPECIFIC DATA-CONTRACTOR ACCESS ☒ YES ☐ NO	9. LEVEL OF SUM A. WORK UNIT

10. NO. CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62778A	3S762778A838	00	105
b. CONTRIBUTING XXXXXXXXX	62110A	3A162110A816	00	105
c. CONTRIBUTING XXXXXXXXX	CARDS 114f			

11. TITLE (Precede with Security Classification Code)*

(U) Pesticide Dispersal Evaluation Set

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

009800 Medical and Hospital Equipment; 002400 Bioengineering

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7504	7906	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR	PRECEDING 77	0.4	13
	CURRENT 78	0.3	15

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

NAME: Dettor, C.M., COL

TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* O'Connor, R.J.

TELEPHONE: (301) 663-7277; AUTOVON 343-7277

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Nelson, J.H.

NAME: Gula, P.R. POC:DA

21. GENERAL USE

Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code)

(U) Pesticide Dispersal; (U) Droplet Size; (U) Insect Control; (U) EPA Requirements

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To develop a pesticide field evaluation set capable of measuring ULV droplet size and total pesticide amounts applied by military dispersal equipment utilized in insect control operations at military installations in CONUS and overseas.

24. (U) Review commercial or military sources and if search is unsuccessful, fabricate new equipment and field-evaluate for efficacy of design.

25. (U) 7610 - 7709. Commercial particle size measurement systems have been evaluated which operate on the following general principles: direct optical measurement in the aerosol state; electrical sizing and counting after collection in an electrolyte liquid; piezo electric measurement of cumulative mass by frequency to voltage conversion. Combination of this work unit and work unit Real Time Field Measurement of Aerosols, DA 0A 8079, has been implemented during FY77. Procurement action has been initiated on the purchase of an optical imaging instrument for the measurement and counting of pesticide aerosol droplets, for the evaluation of various sprayer parameters.

*Available to contractors upon originator's approval.

DD FORM 1 MAR 68 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A, 1 NOV 65 AND 1498-1, 1 MAR 68 (FOR ARMY USE) ARE OBSOLETE. ☆ U.S. GPO: 1974—540-843/8691

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA OB 6059	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
76 10 01	D. CHANGE	U	U	NA	NL	☒ YES ☐ NO	A. WORK UNIT

10. NO./CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62778A	3S762778A838	00	106
XXXXXXXXX	62110A	3A162110A816	00	106
XXXXXXXXX	CARDS 114f			

11. TITLE (Precede with Security Classification Code)*
(U) Preventive Medicine (Entomology) Field Laboratory, Modular

12. SCIENTIFIC AND TECHNOLOGICAL AREAS* 009800 Medical and Hospital Equipment; 002400 Bioengineering; 005900 Environmental Biology

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7504	8110	DA	C. In-House

17. CONTRACT/GRANT
a. DATES/EFFECTIVE: EXPIRATION:
b. NUMBER*
c. TYPE: d. AMOUNT:
e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR	PRECEDING 77	0.2	08
	CURRENT 78	0.5	20

19. RESPONSIBLE DOD ORGANIZATION
NAME:* US Army Medical Bioengineering Research & Development Laboratory
ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL
NAME: Dettor, C.M., COL
TELEPHONE: (301) 663-2434; AUTOVON 343-2434

21. GENERAL USE
Foreign Intelligence Not Applicable

20. PERFORMING ORGANIZATION
NAME:* US Army Medical Bioengineering Research & Development Laboratory
ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)
NAME:* Driggers, D.P.
TELEPHONE: (301) 663-7237; AUTOVON 343-7237
SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS
NAME: O'Connor, R.J.
NAME: Hembree, S.C. POC:DA

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Mobile Field Laboratory; (U) TOE 8-620H; (U) Entomology Laboratory Team; (U) Portable Unit

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To provide a mobile field laboratory module that will accommodate mission oriented equipment and provide working space for personnel assigned to the Entomology Laboratory Teams as authorized by TOE 8-620H.

24. (U) Review available military mobile shelters and modify as required. If no suitable unit is available, design and fabricate a suitable module.

25. (U) 7610 - 7709. The M-51 shelter system, collective protection, chemical-biological, trailer transported previously identified as a candidate shelter for use as the field laboratory has been found unsatisfactory for the intended purpose. Another unit, the mobile field kitchen trailer, MKT-75 has been identified as a new candidate to satisfy the requirements. This unit with modification appears to be applicable for use by LA-LD preventive medicine teams. It is currently being evaluated at USAMBRDL for use as a frontline aid station.

*Available to contractors upon originator's approval.

Entomology Field Laboratory, Modular

3S762778A838.00.106

Detail Sheet

1. Background:

a. A requirement was established by reference listed at 4a to develop a module to provide working space for the Entomology Laboratory Team (LE) and its equipment as authorized by TO&E 8-620H.

b. Military mobile shelters were reviewed for applicability. The M-51, chemical/biological collective protective shelter was selected as the most feasible unit currently available that could be modified to operate as a mobile entomology station.

c. This unit has subsequently been eliminated as a candidate as it proved unsatisfactory from the aspects of maintenance and excessive fuel consumption.

d. The mobile field kitchen trailer, MKT-75 has been identified as a candidate to satisfy the requirement of this work unit. This trailer is currently being evaluated at USAMBRDL for use as a frontline aid station.

2. Conclusions:

The mobile field kitchen trailer, MKT-75, when modified, will be applicable for use by all preventive medicine teams authorized by TOE 8-620.

3. Recommendations:

a. That this work unit be continued as an active work unit in the 838 program and that it be moved into the 836 and 832 programs in FY79.

b. That this work unit be worked on in conjunction with the work unit - frontline aid station - to minimize duplication of efforts.

4. References:

a. Letter, SGRD-SDM to USAMBRDL dated 31 March 1975, subject: Proposed Entomological Tasks.

b. Technical Manual, TM 3-4240-264-34P, Direct Support and General Support Maintenance Repair Parts and Special Tools Lists for Shelter System, Collective Protection, Chemical-Biological: Inflatable, Trailer-Transported, M-51 (NSN 4240-00-854-4144).

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA 0B 6173	77 09 30	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISB'N INSTR'N	8b. SPECIFIC DATA - CONTRACTOR ACCESS	9. LEVEL OF SUM
76 10 01	K. COMPLETION	U	U	NA	NL	[X] YES [ ] NO	A. WORK UNIT

10. NO CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	62778A	3S762778A838	00	109
XXXXXXXXX	62110A	3A162110A816	00	109
XXXXXXXXX	CARDS 114f			

11. TITLE (Precede with Security Classification Code)*

(U) London Fogger, Insecticide

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

009800 Medical and Hospital Equipment; 005900 Environmental Biology

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7603	7704	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING	7T	0.2	07
FISCAL YEAR CURRENT	77	0.3	10

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

NAME: Dettor, C.M., COL

TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* Gula, P.R.

TELEPHONE: (301) 663-7237; AUTOVON 343-7237

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Hodge, J.W.

NAME: Nelson, J.H. POC:DA

21. GENERAL USE

Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Pesticide Dispersal Equipment; (U) London Aire XW; (U) Engineering Tests; (U) Ultra Low Volume (ULV)

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To determine the durability of the London Aire Model XW by engineering tests. These units will be used by military medical and engineering personnel for controlling mosquitoes and other flying insects. Results will provide the user agencies with durability data for purchase through military channels.

24. (U) To determine the operational capabilities of the London Aire Model XW by quantitative methods. Measurable quantitative parameters include: particle size determination and maintenance and flow rate. General engineering design observations will include: corrosive effect of pesticide during tests, verification of manufacturer's claim of performance specifications, general durability definitions as applied to mean time between breakdown, maintenance time, gas and oil consumption and definition of high mortality repair parts.

25. (U) 7610 - 7709. The London Aire Ultra Low Volume (ULV) aerosol generator was subjected to 750 hours of engineering durability testing. The machine performed well during 750 hours of testing. Droplet production tests indicate a volumetric median droplet size that is satisfactory (VMD of about 12 microns which is considerably less than the 17 micron malathion label requirement). Calibration, machine components, safety, and human factors were found to be satisfactory. During the tests it was noted that a nozzle maintenance requirement was not identified in the maintenance instructions. With the exception of this nozzle maintenance instruction deficiency, the London Aire is judged to be satisfactory for military use as an "off the shelf" commercial machine. A final technical report has been prepared.

*Available to contractors upon originator's approval.

London Fogger, Insecticide

3S762778A838.00.109

Detail Sheet

1. Background:

The US Army Medical Research and Development Command (USAMRDC) tasked the US Army Medical Bioengineering Research and Development Laboratory (USAMBRDL) with the responsibility of performing durability tests on ultra low volume (ULV) aerosol generators. The testing of ULV generators was required because the equipment has recently become available and is not currently controlled by government specifications. The London Aire Fogger was provided by the manufacturer at no cost to the government.

Ultra low volume refers to the dispersal of relatively small volumes of concentrated insecticide as opposed to the fogger technique which disperses large volumes of diluted insecticide. To be effective, the ULV machine must atomize the insecticide into a fine spray with droplet VMD (Volumetric Mean Diameter) of 17 microns or less (for Malathion). When applied properly ULV has been found to produce better control with less insecticide. Also, ULV dispersal eliminates the hazardous mixing necessary in the fogger systems. As a result, the ULV technique has come into general use in the United States and is recommended as the method of choice in military mosquito control programs.

All ULV machines are commercial equipment designed primarily for mosquito control by dispersal from truck or jeep. The basic components of the ULV machine are the nozzle, compressor, and gasoline engine. The compressor, which is driven by the engine, provides compressed air to the nozzle for spray atomization. It also provides pressure to the insecticide tank to force the insecticide from the tank, through the control panel, to the nozzle. The level of air pressure is controlled by engine R.P.M. Control panels are provided to monitor flow rate, insecticide temperature and air pressure.

2. Conclusions:

The London Aire ULV aerosol generator was subjected to 750 hours of engineering durability testing. With the exception of a deficiency in the nozzle maintenance instructions, the London Aire was judged to be satisfactory for military use as an "off the shelf" commercial machine; however, a number of improvement recommendations are provided which would further refine the operation of the machine.

3. Recommendations:

That the London Aire be recommended for purchase by the military if the maintenance instructions are amended to identify the nozzle cleaning requirements.

London Fogger, Insecticide cont'd

4. References:

a. Letter, AFPCB to HQDA(SGRD-SGM) dated 9 June 1975, subject: Durability of Pesticide Dispersal Equipment.

b. Memorandum, (SGRD-SDM) dated 9 September 1975, subject: Responsibility for Research and Development of Pesticide Dispersal Equipment.

c. Letter, HQDA(SGRD-SDM) to USAMBRDL, dated 16 October 1975, subject: Engineer Design and Durability Testing.

d. DA Form 200, HQDA(SGRD-RP) to USAMBRDL, dated 8 April 1976, subject: Approval of DA OB 6173 A. New 816-109, London Fogger, Insecticide.

COMBAT MEDICAL MATERIEL

(Military Medical Materiel, Advanced Development)

3S763732A836

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION* DA 0B 6178	2. DATE OF SUMMARY* 77 10 01	REPORT CONTROL SYMBOL DD-DR&E(AR)636
3. DATE PREV SUM'RY 76 11 15	4. KIND OF SUMMARY D. CHANGE	5. SUMMARY SCTY* U	6. WORK SECURITY* U	7. REGRADING* NA	8a. DISP'N INSTR'N NL	8b. SPECIFIC DATA-CONTRACTOR ACCESS ☒ YES ☐ NO	9. LEVEL OF SUM A. WORK UNIT

10. NO. CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	63732A	3S763732A836	00	001
XXXXXXXXG	62778A	3S762778A838	00	001
XXXXXXXXG	CARDS 114f			

11. TITLE (Precede with Security Classification Code)*

(U) Emergency Sterilizer, Engineering Evaluation of

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

010100 Microbiology; 009800 Medical and Hospital Equipment

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7607	7806	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR	PRECEDING 77	0.2	15
	CURRENT 78	0.3	15

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

NAME: Dettor, C.M., COL

TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* Prensky, W.C.

TELEPHONE: (301) 663-7277; AUTOVON 343-7277

SOCIAL SECURITY ACCOUNT NUMBER:

21. GENERAL USE

Foreign Intelligence Not Applicable

ASSOCIATE INVESTIGATORS

NAME: Hodge, J.W.

NAME: Patzer, N.H. POC:DA

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Sterilizing; (U) Field Equipment; (U) Medical; (U) Engineering Evaluation; (U) Field Sterilizers; (U) Emergency Sterilizer

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To conduct an engineering evaluation of an improved emergency sterilizer.

24. (U) Upon completion of fabrication of the second generation Emergency Sterilizer by the Castle Company, a test protocol will be prepared and the evaluation will be conducted.

25. (U) 7611 - 7709. Fabrication continuing with delivery of 12 production units expected in November 1977. While the boilers of these units will not be ASME Code stamped, they have been designed in compliance with the Code and future production models should be certified with little difficulty. .

*Available to contractors upon originator's approval.

DD FORM 1 MAR 68 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A, 1 NOV 65 AND 1498-1, 1 MAR 68 (FOR ARMY USE) ARE OBSOLETE. ☆ U.S. GPO: 1974—540-843/8691

EMERGENCY STERILIZER; ENGINEERING EVALUATION OF

3S763732A836.00.001

Detail Sheet

1. BACKGROUND.

This task was established in August 1976 in conjunction with a contract awarded to the Castle Company to design and fabricate 12 units of a second-generation Emergency Sterilizer. The first pilot model of this sterilizer has undergone extensive engineering testing at the Castle Company Plant. The production run is expected to be completed in November 1977. This unit is now known as the U.S. Army Hi-Speed Mini-Sterilizer.

2. CONCLUSIONS.

Preliminary tests and demonstrations of the pilot model have been very successful with rapid sterilization of bare instruments and wrapped loads. Considerable attention has been given to ASME Code certification of pressure vessels in this sterilizer. While these 12 units will not have Code stamped boilers, they do comply with the spirit of the Code and future production models should qualify for code stamping.

3. RECOMMENDATIONS.

Continue engineering support in monitoring the contract. Take part in Operational Test planning and conduct engineering evaluation after 12 units are delivered.

4. REFERENCES.

a. Letter, Castle Company, dated 10 June 1976, subject: Technical Proposal.

b. Letter, SGRD-UBE-G, dated 2 July 1976, subject: Unsolicited Proposal-Castle Company, Rochester, New York, dated 10 June 1976, for further development of an emergency sterilizer.

c. Letter, SGRD-UBE-G, dated 11 February 1977, subject: ASME Code Requirements in Regard to the Castle Company Emergency Sterilizer.

d. Report of Visit dated 25 April 1977, purpose: To Attend Emergency Sterilizer Month Progress Meeting, Rochester, New York, 13-14 April 1977.

e. Report of Visit dated 10 May 1977, purpose: To support Castle Company's application for a ruling from the ASME Code Committee, relieving requirements set forth in Section I of the Code, Nashville, Tennessee, 5 May 1977.

f. Report of Visit dated 24 June 1977, purpose: To support Castle Company application for a ruling from the Task Group relieving requirements set forth in Section I of the Code, New York, New York, 21 June 1977.

g. Letter, SGRD-OPM, undated, subject: Follow-up to Meeting of 18 July 1977.

h. Letter, SGRD-OPM, undated, subject: Test Protocol for U.S. Army Hi-Speed Mini-Sterilizer (DADA Contract 17-73-C-3009).

i. Letter, SGRD-UBE-G, dated 9 Sep 1977, subject: Test Protocol for U.S. Army Hi-Speed Mini-Sterilizer (DADA Contract 17-73-C-3009).

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA 0A 6235	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISP'N INSTR'N	8b. SPECIFIC DATA - CONTRACTOR ACCESS	9. LEVEL OF SUM
76 11 15	H. TERMINATION	U	U	NA	NL	[X] YES [ ] NO	A. WORK UNIT

10. NO./CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	63732A	3S763732A836	00	002
XXXXXXXXXX	62778A	3S762778A838	00	025
XXXXXXXXXX	CARDS 114f			

11. TITLE (Precede with Security Classification Code)*

(U) Evacuator/Injector/Sealer Device, Fabrication of

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

009800 Medical and Hospital Equipment; 010100 Microbiology

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7407	7812	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR	PRECEDING 77	0.1	04
	CURRENT 78	0.0	00

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

NAME: Dettor, C.M., COL

TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* Salisbury, L.L.

TELEPHONE: (301) 663-7277; AUTOVON 343-7277

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Crampton, K.T.

NAME: POC:DA

21. GENERAL USE

Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Packaging; (U) Evacuator; (U) Sealer; (U) Injector; (U) Field Equipment; (U) Field Sterilizing

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To develop an Evacuator/Injector/Sealer device for future military hospital use in sterile medical supply packaging.

24. (U) Design, fabricate and evaluate an improved item.

25. (U) 7611 - 7709. Work unit terminated based on the hazards associated with ethylene oxide. The equipment design required to minimize these hazards results in a system less effective than existing equipment. A final report has been prepared and distributed.

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*Available to contractors upon originator's approval.

DD FORM 1 MAR 68 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A, 1 NOV 65 AND 1498-1, 1 MAR 68 (FOR ARMY USE) ARE OBSOLETE. * U.S. GPO: 1974—540-843/8691

EVACUATOR/INJECTOR/SEALER DEVICE

3S763732A836.00.002

Detail Sheet

1. BACKGROUND.

Present packaging materials (muslin, paper) do not protect hospital sterilized items from contamination by dust, vermin, unintentional tampering, or excessive moisture. The most effective method to provide for and maintain sterile supply storage in a combat environment, is to process medical/surgical supplies in bags/pouches made of medical grade plastic materials which exclude environmental contaminants. This capability does not present exist in U.S. Army Field Medical Treatment facilities. To answer this need, an evacuator, gas injector, sealer device, was developed for USAMRDC by the Medin Corporation (Contract No. DADA17-73-C-3166). The device, as developed, provides three operational modes of operation:

a. Prepackaging of medical/surgical supplies in plastic bags/pouches for sterilization by appropriate means.

b. Post-sterilization hermetic seal of certain packages for long-term storage protection.

c. In-bag ethylene oxide sterilization and aeration of certain heat/moisture labile medical items.

This Laboratory was selected to perform an engineering and operational evaluation of the prototype devices. These evaluations were performed during the second and third quarter FY 75. An evaluation report was submitted to USAMRDC. Based on this report, this Laboratory was tasked to incorporate recommended improvements to and field packaging of advanced prototypes.

2. CONCLUSIONS.

The U.S. Army Medical Department (AMEDD) must be prepared to provide materials of guaranteed sterility as required for field medical care. Although the EIS can satisfy the packaging portion (heat sealing) of this requirement and also provide a capability for in-bag gas sterilization of heat/moisture liable medical items, it was not recommended as a candidate for introduction into the Federal Stock System. This decision is based on the serious hazards associated with the use of ethylene oxide. The equipment design required to minimize these hazards results in a system less effective than existing methods used for gas sterilization. An

In-Progress Review Meeting was convened 21 April 1977 at USAMBRDL, at which time agreement was unanimous that the program be terminated. A final report has been prepared.

3. RECOMMENDATIONS.

None.

4. REFERENCES.

a. Letter, SGRD-SDM, subject: "Army Medical Department Support for Evaluation of Exploratory Prototype of Evacuator/Injector/Sealer Device", dated 13 June 1974.

b. Evaluation Report, USAMBRDL, subject: "Evaluation of Medin Evacuator, ETO Gas Injector and Sealer Machine", 19 December 1974.

c. Letter, SGRD-SDM, subject: "Army Medical Department Support for Evaluation of Exploratory Prototype of Evacuator/Injector/Sealer Device", dated 25 February 1975.

d. Letter, SGRD-RO-D, subject: "Evacuator/Injector/Sealer (EIS)" (ACN 2335) Task No. 836.00.002, dated 3 June 1977.

e. Final Report, USAMBRDL, TR 7708, subject: "Evaluation of Exploratory Prototype of Evacuator/Injector/Sealer Device", dated August 1977.

f. Letter, SGRD-UBE-G, subject: "Evacuator, Gas Injector, Sealer (ETS)", dated 29 September 1977.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA 0A 6290	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
76 11 15	D. CHANGE	U	U	NA	NL	[X] YES [ ] NO	A. WORK UNIT

10. NO. CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	63732A	3S763732A836	00	003
b. ~~XXXXXXXXX~~	62778A	3S762778A838	00	004
c. ~~XXXXXXXXX~~	CARDS 114f			

11. TITLE (Precede with Security Classification Code)*

(U) Environmental Protection Containers for Medical Supplies

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

009800 Medical and Hospital Equipment; 002400 Bioengineering

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7409	7903	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR	PRECEDING 77	1.0	43
	CURRENT 78	0.4	22

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

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RESPONSIBLE INDIVIDUAL

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TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* O'Connor, R.J.

TELEPHONE: (301) 663-7277; AUTOVON 343-7277

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Crampton, K.T.

NAME: POC:DA

21. GENERAL USE

Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Environmental Container; (U) Field Container; (U) Arctic Field Container; (U) Medical Supply Container; (U) Arctic Supplies;

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

(U) Arctic Protection

23. (U) To develop container to protect freezable military medical items in an Arctic environment.

24. (U) Design, fabricate and evaluate a container to meet the requirements of Arctic use.

25. (U) 7611 - 7709. Four advanced development prototypes have been fabricated and are being subjected to developmental and operational tests.

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*Available to contractors upon originator's approval.

DD FORM 1 MAR 68 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A, 1 NOV 65 AND 1498-1, 1 MAR 68 (FOR ARMY USE) ARE OBSOLETE.

* U.S. GPO: 1974—540-343/8691

ENVIRONMENTAL PROTECTION CONTAINER FOR MEDICAL SUPPLIES

3S763732A836.00.003

Detail Sheet

1. BACKGROUND.

Present methods of protecting freezable medical items using heated tents and vehicles in arctic type environments have proved inadequate. To avoid freeze damage and to ensure the availability of freezable items, an improved method of supply and storage is required.

Based on a recommendation from Colonel P. O. Carey, Surgeon, U.S. Army, Alaska, to Colonel R. F. Barquist, OSG, (24 August 1974), this Laboratory was tasked with the development of a method of protecting freezable items. A review of Government/Commercial literature was performed and commercial sources contacted to investigate the possibility of adapting existing equipment. Although items potentially could be modified to satisfy Army requirements, it was determined that the approach of choice would be to fabricate a special container which specifically addressed Army requirements.

A breadboard prototype container was designed, fabricated and subjected to engineering and limited operational testing. The container consists of a aluminum skinned, polyurethane foam insulated box. It is equipped with electrical strip heaters and associated temperature regulation circuitry. When exposed to ambient temperatures ranging from $-60^{\circ}F$ to $+40^{\circ}F$, the temperature at any point inside the container is maintained at an average temperature of $40^{\circ}F$ with maximum temperature excursions at any point within the container limited to $\pm 5^{\circ}F$. For storage and dispensing purposes, a switch selectable temperature set point ($+40^{\circ}F$ or $+70^{\circ}F$) permits maintaining warm injectable fluids for immediate use.

Incorporating recommended improvements resulting from DT I and OT I testing, four advanced development prototypes were fabricated during 1st Qtr FY77 and subjected to OT II tests in Alaska during 2nd Qtr FY77. Abnormally warm weather provided less than satisfactory test conditions and additional operational testing is scheduled. DT II tests are currently being conducted at USAMBRDL and results shall be available 1st Qtr FY78.

2. CONCLUSIONS.

The program is progressing normally through the development cycle.

3. RECOMMENDATIONS.

Complete DT II Testing and conduct additional OT II Testing.

4. REFERENCES.

a. Letter, ARAMD, subject: Environmental Protection Container, dated 28 March 1974.

b. Letter, SGRD-SDM, subject: Environmental Protection Container for Medical Supplies, dated 23 August 1974.

c. Test Report, USAMBRDL, MR 32-75, subject: Environmental Protection Container, dated 7 October 1975.

d. Letter Report, Company C, 172nd Support Battalion, subject: Container Test, dated 9 March 1976.

e. Report, USAMMA, subject: Report of Operational Test II, dated 10 May 1977.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA OB 6171	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
76 11 15	D. CHANGE	U	U	NA	NL	[X] YES [ ] NO	A. WORK UNIT

10. NO. CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	63732A	3S763732A836	00	004
XXXXXXXXX	64717A	3S764717D832	00	005
XXXXXXXXX	CARDS 114f			

11. TITLE (Precede with Security Classification Code)*

(U) Selective Blood Screening Device

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

003500 Clinical Medicine; 009800 Medical and Hospital Equipment

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7602	7912	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 77	0.1	02
FISCAL YEAR CURRENT 78	0.2	07

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering

ADDRESS:* Research & Development Laboratory
Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

NAME: Dettor, C.M., COL

TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering

ADDRESS:* Research & Development Laboratory
Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* Salisbury, L.L.

TELEPHONE: (301) 663-7277; AUTOVON 343-7277

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Stup, J.L.

NAME: POC:DA

21. GENERAL USE

Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code)

(U) Counter; (U) Blood Cell; (U) Field; (U) Medical; (U) Blood Screening

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To develop a Field Blood Cell Counter for future field military laboratory use.

24. (U) Provide engineering assistance in the technical specification, source selection, and subsequent evaluation of a Field Blood Cell Counter.

25. (U) 7611 - 7709. Solicitation published in the Commerce Business Daily by higher headquarters and proposals have been received. A Source Selection Board will be convened during first quarter FY78 to review the proposals.

*Available to contractors upon originator's approval.

DD FORM 1 MAR 68 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A, 1 NOV 65 AND 1498-1, 1 MAR 68 (FOR ARMY USE) ARE OBSOLETE.

* U.S. GPO: 1974—540-843/8691

SELECTIVE BLOOD SCREENING DEVICE

3S763732A836.00.004

Detail Sheet

1. BACKGROUND.

The U.S. Army Medical Bioengineering R&D Laboratory was tasked on 20 January 1976 (reference 4a) to evaluate a Field Blood Cell Counter developed in 1972 by the Beckman Instrument Company. The Beckman Counter did not meet the desired operational and maintenance criteria for field Army blood cell counters. A Technical Report, reference 4c, addressing the various problem areas has been published.

Based on the engineering evaluation, a decision was made to develop a second generation field blood cell counter. Since several commercial organizations possess experience and capabilities in this area, an advertized solicitation was made and proposals received. The proposals address the development of an automatic device suitable for Army field use and capable of rapid and accurate counting of erythrocyte, leukocyte, and thrombocyte components of blood. A source selection board will be convened during the first quarter of FY 78 for selection of contractor.

2. CONCLUSIONS.

None.

3. RECOMMENDATIONS.

Continue to monitor and support development.

4. REFERENCES.

a. Letter, SGRD-SDM, 20 January 1976, subject: Field Blood Cell Counter (Project 832.49.053).

b. Letter, SGRD-SDM, 7 April 1976, subject: Minutes and Recommendations of Joint Working Group, 24-26 March 1976.

c. Technical Report No. 7608, Engineering Evaluation of a Field Blood Cell Counter, September 1976, USAMBRDL.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA 0B 6223	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
	A. NEW	U	U	NA	NL	☒ YES ☐ NO	A. WORK UNIT

10. NO./CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	63732A	3S763732A836	00	005
b. CONTRIBUTING				
XXXXXXXXG	CARDS 1400A			

11. TITLE (Precede with Security Classification Code)*

(U) Pesticide Formulations, Controlled Release, Environmentally Compatible

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

005900 Environmental Biology; 002600 Biology

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7710	8209	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 77	0.0	00
FISCAL YEAR CURRENT 78	1.0	50

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

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20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

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PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* Nelson, J.H.

TELEPHONE: (301) 663-7237; AUTOVON 343-7237

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Desrosiers, R.E.

NAME: Schiefer, B.A. POC:DA

21. GENERAL USE

Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Pesticide Formulations; (U) Controlled-Release; (U) Pest Management; (U) Environmental Compatibility; (U) Vector Control

23. TECHNICAL OBJECTIVE.* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To identify and evaluate environmentally compatible controlled-release pesticide formulations of military relevance for use in support of tactical operations and fixed military installation pest management/vector control programs.

24. (U) Utilizing commercially prepared controlled-release pesticide formulations and carriers potentially suitable for military use, quantify release rates and degradation rates in the laboratory. Those formulations found to be best in laboratory tests will be evaluated in field tests to verify laboratory results under natural environmental conditions. Determinations both in the laboratory and in the field will be biological effectiveness, environmental compatibility, cost effectiveness, and compatibility with current standard pesticide dispersal equipment.

25. (U) None.

*Available to contractors upon originator's approval.

COMBAT MEDICAL MATERIEL

(General Combat Support, Engineering Development)

3S764717D832

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA 0B 6069	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8A. DISB'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
76 10 01	D. CHANGE	U	U	NA	NL	☒ YES ☐ NO	A. WORK UNIT

10. NO./CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	64717A	3S764717D832	00	001
b. CONTRIBUTING				
XXXXXXXXTING	CARDS 1439D	(03)		

11. TITLE (Procode with Security Classification Code)*

(U) Mobile Incinerator, MUST, Evaluation of

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

007800 Hygiene and Sanitation; 005900 Environmental Biology

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7507	7807	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 77	0.5	27
FISCAL YEAR CURRENT 78	1.0	75

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

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RESPONSIBLE INDIVIDUAL

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20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* Prensky, W.C.

TELEPHONE: (301) 663-7277; AUTOVON 343-7277

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Hodge, J.W.

NAME: POC:DA

21. GENERAL USE

Foreign Intelligence Considered

22. KEYWORDS (Procode EACH with Security Classification Code)

(U) MUST; (U) Hospital; (U) Evacuation; (U) Combat Support; (U) Sanitation

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Procode text of each with Security Classification Code.)

23. (U) To conduct an engineering evaluation of the prototype Mobile Incinerator to determine its optimum mechanical performance.

24. (U) To prepare a test protocol which would encompass the required testing and forward a technical report on the results.

25. (U) 7610 - 7709. A test protocol was prepared and approved. Electrical circuits have been isolated and tested for proper functions. Initial test burns revealed a mechanical binding in the rotating primary drum which shut down the incinerator in 2-3 minutes. This has been relieved by a modification and careful realignment. The Mobile Incinerator has completed full burn and purge cycles (90 minutes) and will be turned over for testing per the approved protocol.

*Available to contractors upon originator's approval.

MOBILE INCINERATOR, MUST, EVALUATION OF

3S764717D832.00.001

Detail Sheet

1. BACKGROUND.

This task was established in July 1975. The MUST Mobile Incinerator was previously evaluated in 1970-1971 at Fort Lee, Virginia, as part of testing of the MUST Waste Management System. Tests were aborted because of excessively high external temperatures (the surface of the loading door reached 202°F) and other mechanical problems. Another contract was awarded to AiResearch Corporation for redesign, but this was terminated before completion of design and any system testing. The unit was assembled and delivered to USAMRDC in November 1974.

The unit is required to burn several specified types of waste materials as well as plastics and sludges from the Waste Water Treatment System.

After a test plan was submitted to SGRD-SDM, a 400 Hz Diesel Generator Set was acquired and isolated preliminary checkout of electrical circuits and components was completed. Ten incinerator burns were then initiated (with no waste materials) each of which was aborted in two to three minutes when the primary drum drive stopped and its motor circuit breaker disconnected. The problem was traced to interference of the labrynth air seals caused by thermal expansion of the drum. An emergency repair has been made and complete 90 minute cycles have been run successfully.

2. CONCLUSIONS.

Initial observations suggest that while the circuit design, components and mechanical workmanship are quite good, mechanical design problems exist. These include insufficient allowance for thermal expansion, no provision for continuous introduction of liquid wastes and too low temperature range for the incineration of plastics.

3. RECOMMENDATIONS.

Continue efforts to work out design problems and follow test plan. The prognosis for success here is not good and there is little likelyhood that the Mobile Incinerator will be capable of meeting its specified requirements even if this work succeeds.

4. REFERENCES.

a. Letter, SGRD-SDM, dated 9 April 1974, subject: Mobile Incinerator for the MUST Hospital.

b. Letter, SGRD-SDM, dated 2 May 1974, subject: Mobile Incinerator for the Medical Unit, Self-Contained, Transportable (MUST) Hospital.

c. Report of Visit, SGRD-ZA, dated 31 October 1974.

d. Letter, SGRD-SDM, dated 8 November 1974, subject: Report of Visit.

e. Letter, SGRD-SDM, dated 26 June 1975, subject: Medical Unit Self-Contained Transportable.

f. Letter, SGRD-UBG, dated 14 July 1976, subject: Request for Long-Term Loan of Motor-Generator Sets.

g. Letter, SGRD-UBE-G, dated 12 January 1977, subject: MUST Mobile Incinerator Test Plan.

h. Letter, SGRD-UBE-G, dated 24 January 1977, subject: Request for Long-Term Loan of Diesel Generator Set.

i. Letter, DRSTS-SDI-A, dated 14 February 1977, subject: Loan of Diesel Generator Set.

j. Memorandum, SGRD-UBE-G, dated 1 August 1977, subject: Mobile Incinerator, Primary Drum Rotation Problem.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA 0A 6283	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISB'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
76 10 01	D. CHANGE	U	U	NA	NL	☒ YES ☐ NO	A. WORK UNIT

10. NO./CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	64717A	3S764717D832	00	002
b. CONTRIBUTING				
XXXXXXXXX	CARDS 0149D	(26)		

11. TITLE (Precede with Security Classification Code)*

(U) Cold Injury Rapid Rewarm and Treatment System, Prototype Design and Fabrication

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

009800 Medical and Hospital Equipment; 002400 Bioengineering

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7303	7909	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR	PRECEDING 77	0.4	24
	CURRENT 78	0.5	25

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

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TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* Prensky, W.C.

TELEPHONE: (301) 663-7277; AUTOVON 343-7277

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Crampton, K.T.

NAME: POC:DA

21. GENERAL USE

Foreign Intelligence Considered

22. KEYWORDS (Precede EACH with Security Classification Code)

(U) Cold Injury; (U) Frostbite; (U) Arctic Medicine; (U) Tissue Rewarmer

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To develop a device to be used by forward area medical units to rewarm frozen tissue by immersion or spray with aqueous solution of controlled temperature. Presently there is no satisfactory method of accomplishing this in the field.

24. (U) Design and fabricate a breadboard prototype based upon previous engineering effort. Major technical barrier is to achieve required capability with desired lightweight characteristics.

25. (U) 7610 - 7709. OT II testing was cancelled as a result of the findings of a Customer Support Test performed by the US Army Cold Regions Test Center (patient electrical safety considerations). The requirements document is currently under review. It is anticipated the review will result in the development of two distinct devices, one for rewarming and the other for treatment. A draft Letter Requirement for a rewarmer has been prepared and design initiated on a small lightweight rewarming device.

*Available to contractors upon originator's approval.

DD FORM 1 MAR 88 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A, 1 NOV 68 AND 1498-1, 1 MAR 88 (FOR ARMY USE) ARE OBSOLETE.

COLD INJURY RAPID REWARM AND TREATMENT
SYSTEM, PROTOTYPE DESIGN AND FABRICATION
3S764717D832.00.002

Detail Sheet

1. BACKGROUND.

The U.S. Army Medical Bioengineering R&D Laboratory was assigned the task of developing a Cold Injury Rapid Rewarm and Treatment System in July 1968.

The objective of this task is to produce an item to be used by forward area medical units, using controlled heat and water immersion to rewarm frozen tissue. Due to lack of agreement on the technical details and overall configuration of the device, the required characteristics did not receive approval until 1971 as an Army approved Materiel Need (MN) for a Cold, Injury Rapid Rewarm and Treatment System, reference a. A unit has been designed to meet technical and operational characteristics as defined in a proposed Small Development Requirement (SDR) of July 1968.

In the present hardware configuration, the device is based upon the circulation of temperature controlled solution between a rigid metal tank and a collapsable fiberglass cloth tank. The solution is heated to temperature by a portable immersion heater and is circulated by means of a pump. Turbulence and agitation in the treatment tank are introduced with an aerator to aid in the rewarming and treatment of the affected limbs.

Three (3) prototypes of a Cold Injury Rapid Rewarm and Treatment System were fabricated. Development Test (DT II) and a Customer Service Test (Army Cold Regions Test Center USACRTC) have been completed. Based on USACRTC recommendation, Operational Test (OT II) was cancelled due to a concern for patient and operator safety.

As a result of the above tests, it has been decided that an integrated system for rewarming and treatment of cold injuries is not feasible within the technical constraints of the requirements document. With the large quantities of solution required in the device and the short warm-up time, large quantities of electrical power are necessary. The high power demands of this device make it unsuitable to use in 'far forward' areas of the medical treatment system. Tests performed using simulated frozen extremities at USAMBRDL as well as animal experiments at USARIEM have demonstrated that the alternative methods of rewarming (stillbath, turbulent bath, spray, etc.) perform only slightly better than the use of a stillbath. Therefore, any more sophisticated rewarming techniques should offer cost or operational benefits to be justified.

Preliminary investigations indicate that a system based on a spray technique may possess these benefits. Water requirements can be reduced by a estimated factor of 10 and significant savings in electrical power result from the need to heat the smaller volume of water.

2. CONCLUSIONS.

The present cold injury rapid rewarm system, due to logistical constraints, is impractical for field use at other than large semi-fixed and fixed hospital locations. It is unlikely that the present equipment designed for use in more far forward areas will be suitable in rear area field hospitals. Present efforts are addressing the development of a small lightweight rewarming system for use in forward area field medical facilities.

3. RECOMMENDATIONS.

a. The current development of a small lightweight rewarm system should continue on a priority basis.

b. The need for therapeutic treatment of cold injuries in rear area field treatment facilities must be addressed by the field medical community.

4. REFERENCES.

a. Department of the Army Approved Materiel Need (MN) (ED) (SDR) for Cold Injury Rapid Rewarm and Treatment System, November 1971.

b. Letter, SGRD-SDM, 12 March 1973, subject: Prototype Design and Fabrication - Cold Injury Rapid Rewarm and Treatment System.

c. Development Test (DT II) of Cold Injury Rapid Rewarm and Treatment System, Engineering Evaluation Branch, Technical Support Division, USAMBRDL.

d. Final Report, USACRTC, Customer Support Test of the Cold Injury Rapid Rewarm and Treatment System, dated 18 Mar 1977.

e. Letter, SGRD-SO-D, 4 May 1977, subject: Report of Decisions Reached at Formal in Progress Review.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA 0B 6165	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISB'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
76 10 01	D. CHANGE	U	U	NA	NL	X YES ☐ NO	A. WORK UNIT

10. NO./CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	64717A	3S764717D832	00	003
b. CONTRIBUTING				
XXXXXXXXX	CARDS 1670			

11. TITLE (Precede with Security Classification Code)* (U) Family of Hypodermic Injection Apparatuses, Jet, Automatic, Veterinary Medicine, Field

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

008800 Life Support; 009800 Medical and Hospital Equipment; 002600 Biology

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7510	7812	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR	PRECEDING 77	1.4	80
	CURRENT 78	0.5	25

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

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TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

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SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Malek, J.W.

NAME: POC:DA

21. GENERAL USE

Foreign Intelligence Considered

22. KEYWORDS (Precede EACH with Security Classification Code)

(U) Immunization; (U) Vaccination; (U) Animal; (U) Disease Control

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To develop a family of hypodermic injection apparatuses for use in Army veterinary medicine (in mass immunization programs) for controlling animal-borne-diseases transmissible to man either directly or through other susceptible animals, thereby directly affecting the health of the soldier or reducing the supply of animal-provided food products.

24. (U) Provide accessories to the standard items (FSN 6515-00-656-1021 and 6515-00-919-0097) to adopt apparatuses designed for human use making them suitable for veterinary use on animals. In addition, provide a backpack, hand-operated pump for use on large animals in pens. Complete the RDT&E initiated in completed Task 3A162110A816.00.037.

25. (U) 7610 - 7709. Prototype injectors have been designed and fabricated. Development Plan and DT II Test Plan have been prepared. In a Joint Work Group Meeting (26-28 July 1977) agreement was reached to revise ROC to delete electrical injector and concentrate on an Injector Set offering foot and/or backpack operation. DT II testing is underway and plans have been made for a Maintenance Evaluation and OT II Testing to follow in February 1978.

*Available to contractors upon originator's approval.

DD FORM 1 MAR 68 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A, 1 NOV 65 AND 1498-1, 1 MAR 68 (FOR ARMY USE) ARE OBSOLETE.

* U.S. GPO: 1974—540-843/8691

FAMILY OF HYPODERMIC INJECTION APPARATUSES,
JET, AUTOMATIC, VETERINARY MEDICINE, FIELD
3S764717D832.00.003

Detail Sheet

1. BACKGROUND.

A Required Operational Capability (ROC) covers the development of a family of hypodermic jet injectors for veterinary use based on the need for controlling animal-borne-diseases transmissible to man either directly or through other susceptible animals. Such diseases impact on the Army by directly affecting the health of the soldier and by reducing the supply of animal-provided food products.

The developmental effort we initiated in January 1967 when a task was established at USAMERDL, Ft. Totten, at the request of the Director, USAMBRL, WRAMC, to develop a veterinary jet injector for inoculation of drugs and biologicals in individual and herd use, particularly for use with the experimental Venuzuelan Equine Encephalitis (VEE) vaccine under development at Fort Detrick. In July 1967, USAMBRDL shipped USAMBRL crowned nozzles, designed for use on furry animals without shaving, to be evaluated on the (human) foot powered injector (FSN 6515-910-0097) previously developed at USAMERDL. Clinical trials during 1967-1968 in Columbia, S.A. (by Dr. Stewart McConnell, LTC, VC) using above injector and VEE vaccine on over 2,000 animals and at Animal Farm, Fort Meade, on horses confirmed that VEE vaccine by jet injection is comparable to syringe-needle with regard to increased post-bleed over pre-bleed titers. Additional tests at U.S. Army Medical Unit, WRAMC, Fort Detrick on guinea pigs confirmed the results. The tests in Columbia by Dr. McConnell indicated need for a back packed unit to provide the operator with necessary freedom of movement.

In October 1969, with loss of investigator at USAMBRL, the R&D Command arranged for evaluation of the injector at the U.S. Department of Agriculture Plum Island Animal Disease Laboratory during their experimental studies of inactivated foot and mouth disease vaccines combined with various oil base adjuvants. In the half year that followed, USAMERDL demonstrated that injectors function satisfactorily with these oil base adjuvants. USDA prepared a test protocol and requested permanent transfer of an injector to satisfy rigid isolation requirements at the Plum Island Laboratory. In August 1970, injector was transferred, personnel were trained, and tests initiated on pigs. In November 1970, USDA submitted a test report indicating satisfactory results.

In June 1970, the R&D Command requested that the Project Engineer, USAMBRDL visit Dr. Stewart McConnell, now at the College of Veterinary Medicine, Texas A&M University, with a view toward a contract to completely evaluate the jet injectors for veterinary medicine. A design of a larger vaccine section, to permit doses in excess of 2 cc was initiated. A target date of 5 February 1971 was established for delivery of evaluation equipment to Dr. McConnell. By agreement development of a back pack mounted unit was held in abeyance until basic injectors and accessories are demonstrated as acceptable.

During latter part of 1970 and early 1971, a new vaccine section was developed as well as a force intensifyer which permitted this larger dose to be administered. In June 1971, a contract (DADA 71-71-C-1087) was awarded to Texas A&M University covering two phases: (1) evaluation of present equipment and required characteristics; (2) evaluation of prototype equipment under field conditions. The project engineer, USAMBRDL, visited Texas A&M to deliver equipment and train operators in their use. During 1971-1973 the investigation at Texas A&M showed the complete feasibility of jet injection for veterinary use on both small and large animals, proved the feasibility of developing accessory equipment to convert the human injectors so that they are satisfactory for veterinary use and indicated again the need for a back-packed mounted unit.

In August 1973, the project engineer, USAMBRDL, visited Vernitron Medical Products, sole supplier of the human standard hypodermic jet injectors, to determine the feasibility of mounting and operating a foot powered injector on a back frame. In September 1973, SGRD-SDM, established a work unit to develop a Veterinary Injection Apparatus, Backpack, Field, based upon the feasibility established at Vernitron Medical Products. Such a device was designed, fabricated and tested at USAMBRDL and was shipped to Texas A&M for clinical and field trials on 8 May 1974. During November 1973, crowned veterinary nozzles were fabricated in sufficient quantity to support clinical and operational testing. Two nozzle sizes were fabricated: (1) .005 inch diameter and (2) .009 inch diameter in accordance with optimum nozzle sizes determined for small and large animals by Dr. McConnell. Dr. McConnell reported in March 1975 of his successful field trials in Mexico where he employed the back pack injector under field conditions. He requested two minor improvements. In September 1975, Dr. McConnell reported successful use of the injector on cattle in Idaho, Oregon and Colorado.

In March 1974 a program of rabies control in the Phillipines by a Veterinary Officer, Fifth Special Forces Group was planned. Three foot injector prototypes were prepared at USAMBRDL for this program. Due to unforeseen developments, the rabies study program in the Phillipines was cancelled and in November 1974 the three units were shipped to Thailand. Once again, planned program was aborted and unused units were returned to USAMBRDL in December 1975. The rabies study which required deep intramuscular injections was added to the Texas A&M study.

During October 1975, USAMBRDL was directed by SGRD-SDM to convert the program from exploratory development (6.2 funds) to category 6.4 for final development of a family of injectors. During March 1976 an IPR was held and minor corrections in weight and cube were approved to the ROD, dated 12 August 1975. At that time a foot-powered and a back-pack mounted unit was available. An electrical unit, described in the ROC, was not available since the standard electrical unit for human use (FSN 6515-656-1021) had insufficient hydraulic power to operate a unit with a 2 cc head and intensifier in place. On 7 April 1976 a purchase order was placed with Vernitron Medical Products to procure an electrical veterinary injector with increased electrical horsepower and increased hydraulic pressure capability. In addition, accessory lengths of hoses were obtained to permit increase of working radius of from 6 to 30 feet from the unit. Unit was delivered in May 1976.

During May - June 1976, arrangements were made to test a foot-powered and the electrical injector on thousands of swine (2 cc injections of Eryspales Bacterin) using the Virginia Polytechnic Institute Extension Service. Exercise indicated that units were feasible for veterinary injection, however, the bottle holder required modification to securely hold the large bottles used in veterinary medicine (since accomplished) and the electrical injector was not as well tolerated by the nervous swine as the foot powered injector which had no high pitched motor noise associated with its operation. A back-packed injector was not available during these trials, but seemed to be the unit of choice.

During June 1976 work was initiated at USAMBRDL to fabricate an additional three back-packed units. In addition, five more electrical injectors were ordered from Vernitron Medical Products for delivery during October 1976.

During 1977, the prototypes were completed. A development plan was prepared in cooperation with USAMRDC. A DT II Test Plan was prepared and DT II Testing has started. In a Joint Working Group (JWG) Meeting held 26-28 July 1977, a decision was made to revise the ROC to delete "family" and substitute "set". The electrical injector was not considered necessary for Army use. The set consists of an injector capable of foot operation or hand operation on a back-pack. Present plans are to revise the ROC by a correspondence IPR. A maintenance evaluation by National Maintenance Point, USAMMA has been arranged and OT II testing at Leavenworth, Kansas, is scheduled for February - May 1978.

2. CONCLUSIONS.

A set of hypodermic injectors appear to be feasible to cover the veterinary field. All accessories designed have worked well during clinical trials on both small and large animals.

3. RECOMMENDATIONS.

Evaluation should continue with the ultimate goal of type classifying as standard, a set of veterinary jet hypodermic injectors.

4. REFERENCES.

a. Letter, USA Medical Biomedical Research Lab, dated 3 June 1967, subject: Jet Injection in Veterinary Medicine, Serial MEDEC-MERL.

b. Letter, USA Department of Agriculture, Plum Island Animal Disease Lab, dated 11 February 70, subject: Jet Injector, Veterinary Medicine.

c. Letter Progress Reports (No. 1 and No. 2), U.S. Department of Agriculture, Plum Island Disease Lab, dated 16 November 1970 and 14 May 1971.

d. Contract No. DADA 17-71-C-1087, Texas A&M University, dated 24 May 1971, subject: Jet Injection in Large Animal Medicine, Jet Injector Evaluation.

e. Trip Report, USAMBRDL, dated 17 September 1973 to Vernitron Medical Products, subject: "Jet Injector, Veterinary Medicine, Task 816.14.051".

f. Letter, USAMRDC, dated 17 September 73, subject: Veterinary Injection Apparatus, Backpack, Field.

g. Required Operational Capability (ROC) for a Family of Hypodermic Injection Apparatuses, Jet, Automatic, Veterinary Medicine, Field, dated 12 August 1975.

h. Letter, USAMRDC, dated 2 October 1975, subject: Required Operation Capability (ROC) for a Family of Hypodermic Injection Apparatuses.

i. Minutes of Formal Special In-Process Review (IPR), 23-24 March 1976 prepared by USAMRDC (SGRD-SDM) on 7 April 1976.

j. Letter, Virginia Polytechnic Institute and State University, Cooperative Extension Service, dated May 19, 1976.

k. Letter, SGRD-RO-D, 18 June 1977, subject: "Family of Hypodermic Injection Apparatuses, Jet, Automatic, Veterinary Medicine", with Inclosure "Development Plan, Family of Hypodermic Injection Apparatuses, Jet, Automatic, Veterinary Medicine, Field".

l. Letter, SGRD-UBE, 23 June 1977 and 1st Ind, SGRD-OPM, 8 August 1977, subject: "Family of Hypodermic Injection Apparatuses,Jet, Automatic, Veterinary Medicine, Field, with Inclosure DT II Test Plan".

m. Report of Visit, Joint Working Group Meeting, 27-28 July 1977, A. Ismach, USAMBRDL.

n. Resume Sheet, For Non-Major Systems (CAT 4) dated 4 Aug 1977, Test Title: "Hypodermic Injection Set, Jet, Automatic, Veterinary Medicine, Field".

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA 0A 6282	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
76 10 01	D. CHANGE	U	U	NA	NL	[X] YES [ ] NO	A. WORK UNIT

10. NO./CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	64717A	3S764717D832	00	004
b. CONTRIBUTING				
XXXXXXXXX	CARDS 114f			

11. TITLE (Precede with Security Classification Code)*

(U) Bag, Patient Holding and Evacuation, Prototype Design and Fabrication

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

009800 Medical and Hospital Equipment; 002400 Bioengineering

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7304	7906	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 77	0.5	26
FISCAL YEAR CURRENT 78	0.6	35

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

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20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* Prensky, W.C.

TELEPHONE: (301) 663-7277; AUTOVON 343-7277

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Stup, J.L.

NAME: POC:DA

21. GENERAL USE

Foreign Intelligence Considered

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Evacuation Bag; (U) Arctic Medicine; (U) Cold Climate Medical Material; (U) Patients, Transportation of

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To develop a patient holding and evacuation system capable of maintaining casualties of desired, controlled temperatures in extreme cold climates for prolonged periods. Currently available evacuation bags cannot adequately maintain cold climate patients at required temperatures.

24. (U) Design and fabricate developmental prototypes based upon previous engineering effort. Existing state-of-the-art materiel will be used. Major technical barrier is to achieve required temperature duration capability with required lightweight characteristics.

25. (U) 7610 - 7709. Due to the failure to achieve the desired technical characteristics, the existing requirements document (SDR) has been critically reviewed. Actions have been initiated to re-establish this task under a Letter Requirement. The new document will address the development of a system(s) for providing supplementary heat to casualties transported in the existing casualty evacuation bag.

*Available to contractors upon originator's approval.

DD FORM 1 MAR 68 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A, 1 NOV 65 AND 1498-1, 1 MAR 68 (FOR ARMY USE) ARE OBSOLETE.

BAG, PATIENT HOLDING AND EVACUATION
PROTOTYPE DESIGN AND FABRICATION
3S764717D832.00.004

Detail Sheet

1. BACKGROUND.

At present the means for handling sick and injured personnel during northern operations soon after injury, is unsatisfactory. This task addresses the development of a heated patient holding and evacuation system for the handling of sick and injured personnel in cold environments. It is intended to favorably resolve the existing operational deficiency posed by the lack of an adequate patient holding and evacuation bag.

Information concerning the identification of this requirement is described in the Small Development Requirement (SDR) which was first proposed in July 1966 and approved 12 January 1971. Funding shortfalls delayed the start of development, until April 1973 when USAMBRDL was tasked to initiate an in-house effort. Studies indicated that the initial development effort would benefit from current work by NARADCOM on lightweight, cold weather sleeping gear. USAMBRDL provided funds to NARADCOM in November 1973 to design and fabricate prototypes. These prototype bags and electrically heated liners have been designed, fabricated and development tasks performed using the environmental test facilities of USARIEM and USAMBRDL.

Unfortunately the equipment did not satisfy the essential characteristics of the SDR document. Although it may be technically feasible to design such a system, factors such as cost, physical weight, and size restrictions make the resultant system impractical for field use. Based on the experience acquired to date, the requirements document was reassessed and the minimum essential characteristics required of a patient holding and evacuation system determined.

A Draft Letter Requirement (LR) has been prepared to replace the existing over-restrictive SDR. The LR has been expanded to include alternate concepts of supplying supplemental heat to casualty bags. Current alternatives which are being evaluated include an electrically heated blanket/liner (in-house) a propylene fuel fixed power source and associated liquid loop liner (Energy Systems) and the Norwegian Personnel Heater (charcoal burner, patented foreign development). The Personnel Heater will be evaluated using the charcoal burner element and using an electrical heater element (in-house development).

The electrical heater element will be configured to be substituted directly for the charcoal burner element.

An additional liquid loop pad, manufactured by Graymar Corporation was evaluated with the Energy Systems Corporation power unit. The Graymar Unit held 0.87 gallons of liquid which exceeded the heating capacity of the power unit so that only half of it was heated.

2. CONCLUSIONS.

None.

3. RECOMMENDATIONS.

Concentrate on evaluating and developing the most cost and operations effective method for supplying supplemental heat to the existing casualty bag. The criterion for design under the new Letter Requirement should be the prevention of excessive deep body cooling or obviously low skin temperatures rather than absolute subjective comfort.

4. REFERENCES.

a. D/F, SGRD-UE-ME, dated 30 June 1975, entitled: "Evaluation of Prototype Heated Casualty Evacuation Bag".

b. Letter, SGRD-UBE-G, dated 11 July 1975, entitled: "Evaluation of Artech Heated Casualty Evacuation Bag".

c. "Design and Fabrication of a Prototype Inflatable Heated Casualty Evacuation Unit", Final Report, dated September 1975, DDC #ADA019697.

d. Memo, USAMBRDL, MR 34-75, dated 21 October 1975, entitled: "Test Report, Bag, Patient Holding and Evacuation".

e. Memo, USAMBRDL, MR 7-76, dated 24 March 1976, entitled: "Evaluation of Natick Prototype Casualty Evacuation Bag".

f. Letter, SGRD-UE-ME, dated 26 May 1976, entitled: "Bag Patient, Holding and Evacuation, Heated".

g. Letter, SGRD-UBE-G, dated 22 October 1976, entitled: "Review of Draft Report".

h. Report of Visit, dated 12-15 June 1977, USAAHS, San Antonio, Texas, Purpose: To Coordinate Development of Heated Casualty Bag.

i. Report of Visit, dated 11-14 July 1977, San Francisco, California, Purpose: To Attend Intersociety Conference on Environmental Systems — Present Paper on Cold Weather Equipment.

j. "Evaluation of Graymar Liquid Circulating Pad, Report dated 8 September 1977, USAMBRDL.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA 0B 6177	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISP'N INSTR'N	8b. SPECIFIC DATA - CONTRACTOR ACCESS	9. LEVEL OF SUM
76 12 30	K. COMPLETION	U	U	NA	NL	[X] YES [ ] NO	A. WORK UNIT

10. NO./CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	64717A	3S764717D832	00	006
b. CONTRIBUTING				
XXXXXXXX	CARDS 1400R			

11. TITLE (Precede with Security Classification Code)*

(U) Dental Operating and Treatment Unit, Field

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

009800 Medical and Hospital Equipment; 002400 Bioengineering

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7604	7706	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR	PRECEDING 7T	0.1	01
	CURRENT 77	0.1	01

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

NAME: Angel, C.R., COL

TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* Malek, J.W.

TELEPHONE: (301) 663-7277; AUTOVON 343-7277

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Gillespie, K.P.

NAME: POC:DA

21. GENERAL USE

Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code)

(U) Dental Operating Units; (U) Dental Treatment Unit; (U) Dental Field System; (U) Portable Dental Equipment; (U) Dental Field Support

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To develop a lightweight, portable, rugged dental operating and treatment unit for field military use.

24. (U) Obtain candidate commercial equipment and evaluate for suitability.

25. (U) 7610 - 7612. "First Article" production items have been validated and delivery to depots are in progress.

*Available to contractors upon originator's discretion.

DENTAL OPERATING AND TREATMENT UNIT, FIELD

3S764717D832.00.006

Detail Sheet

1. BACKGROUND.

The major effort of the development cycle was previously conducted under the 816 Program (Field Area Dental Support System). Based on data and evaluations conducted at Fort Sam Houston, Texas, USAREDR, and Fort Jackson, S.C., over the years, the item was considered to be an acceptable piece of field Dental equipment as a direct replacement for the Dental Operation and Treatment Unit, Field, NSN 6520-00-930-7951.

An In-Process-Review was held in March 1976, where the data and recommendations for this piece of equipment to be type classified were presented. Decision of the IPR members was that this item be type classified.

Supplemental actions by the Defense Medical Material Board (DMMB) and the Defense Personnel Support Center (DPSC) resulted in the type classification action as Standard-A and assigned as NSN 6520-00-140-7663.

On 15 July 1976, DPSC entered into a contract with A-dec Inc., Newberg, Oregon, for the fabrication of 475 units. Visual and physical inspections of the 1st Article was conducted by USAMBRDL. Operational evaluations was conducted by USAREDR. On 17 September 1976, DD Form 1222 prepared by USAMBRDL accepting the 1st Article Sample was returned to DPSC.

On 15 December 1976, a letter from USAMRDC was received which advised that the delivery of the unit to depots were in progress and that this task is considered to be completed.

2. CONCLUSIONS.

None.

3. RECOMMENDATIONS.

None.

4. REFERENCES.

a. Clinical Evaluations, Fort Sam Houston, Texas, March 1970.

b. Military Potential Test, USAREDR, February - May 1971.

c. Military Potential Test, Fort Jackson, S.C., November 1972 - January 1973.

d. Letter Requirement, HSA-CDM, 18 February 1976.

e. Minutes of IPR, March 1976.

f. Contract, DSA 120-76-C-2432, DPSC, July 1976.

g. DD Form 1222, USAMBRDL, 17 September 1976.

h. Letter, SGRD-SDD, dated 15 December 1976.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA 0A 6247	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISP'N INSTR'N	8b. SPECIFIC DATA - CONTRACTOR ACCESS	9. LEVEL OF SUM
76 12 30	K. COMPLETION	U	U	NA	NL	☒ YES ☐ NO	A. WORK UNIT

10. NO./CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	64717A	3S764717D832	00	007
b. CONTRIBUTING				
XXXXXXXXX	CARDS 1401R			

11. TITLE (Precede with Security Classification Code)*

(U) Compressor-Dehydrator, Dental Equipment, Portable

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

009800 Medical and Hospital Equipment; 002400 Bioengineering

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
6910	7706	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR	PRECEDING 7T	0.1	01
	CURRENT 77	0.1	01

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

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20. PERFORMING ORGANIZATION

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PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* Malek, J.W.

TELEPHONE: (301) 663-7277; AUTOVON 343-7277

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Gillespie, K.P.

NAME: POC:DA

21. GENERAL USE

Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code)

(U) Dental; (U) Field Equipment; (U) Air Compressor; (U) Compressor-Dehydrator

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To provide an improved compressed air source to power high speed air hand pieces of field dental equipment.

24. (U) Obtain possible replacement equipment and evaluate for suitability.

25. (U) 7610 - 7612. "First Article" production items have been validated and delivery to depots have been completed.

*Available to contractors upon originator's approval.

COMPRESSOR-DEHYDRATOR

DENTAL EQUIPMENT, PORTABLE

3S764717D832.00.007

Detail Sheet

1. BACKGROUND.

This item is a companion piece of equipment to the Dental Operating and Treatment Unit, Field. Its only function is to provide dry compressed air to drive the various hand pieces of the treatment unit and to provide the air pressure needed to function the water supply element.

The major development effort was conducted under the 816 program (Dental Field Compressor). Based on data and evaluation conducted under this program, it was considered to be an acceptable piece of field dental equipment.

An In-Process-Review (IPR) was held in March 1976, where the data was presented. Decision of the IPR members was that this item be type classified.

Supplemental action by the Defense Medical Material Board (DMMB) and the Defense Personnel Support Center (DPSC) resulted in the type classification action as Standard-A and assigned as NSN 6520-00-139-1246.

On 19 April 1976, DPSC entered into a contract with Air Techniques, Inc., for the fabrication of 475 units.

On 15 December 1976, a letter from USAMRDC was received which advised that the delivery of the item to depots were in progress and that this task is considered to be completed.

2. CONCLUSIONS.

None.

3. RECOMMENDATIONS.

None.

4. REFERENCES.

a. Clinical Evaluation, Fort Sam Houston, Texas, March 1970.

b. Letter Requirement, HSA-CDM, 10 February 1976.

c. Minutes of IPR, March 1976.

d. Contract, DSA 120-76-C-0473, DPSC, April 1976.

e. Letter, SGRD-SDD, dated 15 December 1976.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA 0A 6289	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8A. DISB'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
76 10 01	D. CHANGE	U	U	NA	NL	[X] YES [ ] NO	A. WORK UNIT

10. NO 'CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	64717A	3S764717D832	00	008
b. CONTRIBUTING				
c. XXXXXXXXX	CARDS 1406R			

11. TITLE (Precede with Security Classification Code)*

(U) US Army Splint Set Case

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

009800 Medical and Hospital Equipment; 002400 Bioengineering

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7409	7806	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR	PRECEDING 77	0.1	03
	CURRENT 78	0.5	25

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

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20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* O'Connor, R.J.

TELEPHONE: (301) 663-7277; AUTOVON 343-7277

SOCIAL SECURITY ACCOUNT NUMBER:

21. GENERAL USE

Foreign Intelligence Not Applicable

ASSOCIATE INVESTIGATORS

NAME: Cranford, H.B.

NAME: POC:DA

22. KEYWORDS (Precede EACH with Security Classification Code)

(U) Field Equipment; (U) Splint Case; (U) Splint Set; (U) Leg Injury

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To redesign and improve reported deficiencies of the Roll Splint Set (NSN 6545-00-913-5675).

24. (U) To design and fabricate a new case to eliminate deficiencies reported during earlier development and resubmit for evaluation.

25. (U) 7610 - 7709. Testing (OT II) was conducted during the first quarter of FY77 and a test report prepared. IPR convened in April 1977 and voted to submit the case to further operational testing. Further OT II testing was completed during 4Q FY77.

*Available to contractors upon originator's approval.

US ARMY SPLINT SET CASE

3S764717D832.00.008

Detail Sheet

1. BACKGROUND.

The U.S. Army Medical Bioengineering R&D Laboratory was assigned the task of redesigning and improving the deficiencies of the Roll, Splint, Set (NSN 6545-00-913-5675), reference 4a. Some of the deficiencies which had been noted were:

a. The dimensions are not sufficiently large to accommodate any component longer than 30 inches long such as the leg splints.

b. To obtain components for use on a patient, the entire set must be unpacked and laid out flat.

c. Repacking of the components in the set during field conditions is difficult.

d. Due to the looseness of the flaps and straps after repacking, the smaller components can fall out during transport.

The Academy of Health Sciences, reference 4b, recommended development of a new Splint Set Case which would overcome the above deficiencies and have the following characteristics:

a. The case will be longer than the longest components and large enough to accommodate all components.

b. The case will have compartments or pockets on the sides to house the smaller components in a logical sequence. The larger components such as the splints will be stacked on their sides to facilitate ease in selection by combat medical personnel.

c. The case will have carrying straps on either side of the center at the top of the bag. These straps will be durable enough to transport the case with components under field conditions.

d. The case should be designed to allow the combat medic to locate necessary components in the shortest possible time without removing or disturbing the other components.

e. The case should be designed to allow combat medical personnel to repack the case quickly and in a logical sequence under adverse field conditions.

f. The case and any changes made to it should be able to withstand conditions and handling found in a field environment.

Development Tests (DT II) of two (2) prototypes were conducted during January 1976. There were no deficiencies or shortcomings found during these tests. A report, reference 4c, describing the details of test and the test data has been prepared. A drawing and technical data package of the prototype is complete.

A Formal In-Process Review, reference 4d, was held where it was concurred that the development effort should proceed to Operational Tests (OT II).

Having successfully completed the developmental efforts of this task, ten (10) prototypes of the Splint Set Case have been fabricated to be used during Operational Tests. Prototypes were shipped to the Medical Equipment Test and Evaluation, Academy of Health Sciences, Fort Sam Houston, Texas, during the first week of September 1976.

Operational Tests (OT II) were conducted during the period October through December 1976 and a report forwarded.

At the formal In-Process Review, the decision was made to have additional operational testing performed on the splint set case.

The splint set case was shipped to the Medical Equipment Test and Evaluation Division, AHS, Fort Sam Houston, Texas, June 1977.

Additional OT II testing was completed during 4Q FY 77.

2. CONCLUSIONS.

Prototypes of a U.S. Army Splint Set Case which meet the criteria of the requirements document, reference 4e, have been developed and tested. Developmental Test (DT II) have been performed and results of it have been documented. Operational Testing (OT II) of the prototype cases have been initiated. A technical data package of the device has been completed.

3. RECOMMENDATIONS.

None.

4. REFERENCES.

a. Letter, SGRD-SDM, 27 January 1974, subject: Case, Splint Set, NSN: 6545-00-913-5675.

b. Letter, AHS-DMA, 25 April 1974, subject: Request for Improvement of Case, Splint Set.

c. Development Test of Case, Splint Set, 28 January 1976, USAMBRDL.

d. Letter, SGRD-SDM, 7 April 1976, subject: Minutes and Recommendations of Joint Working Group, 24-26 March 1976.

e. Letter Requirement (LR) for U.S. Army Splint Set Case, 18 February 1976.

f. Report of Operational Test (OT II), U.S. Army Leg Splint and Case (MET&E Project No. 9-76), 31 January 1977.

g. Minutes of formal In-Process Review (IPR), 21-22 April 1977, USAMBRDL.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA 0A 6286	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
76 10 01	D. CHANGE	U	U	NA	NL	[X] YES [ ] NO	A. WORK UNIT

10. NO./CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	64717A	3S764717D832	00	009
b. CONTRIBUTING				
XXXXXXXXX	CARDS 1403R			

11. TITLE (Precede with Security Classification Code)*

(U) US Army Leg Splint

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

009800 Medical and Hospital Equipment; 002400 Bioengineering

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7409	7806	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 77	0.1	03
FISCAL YEAR CURRENT 78	0.5	24

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

NAME: Dettor, C.M., COL

TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

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PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* O'Connor, R.J.

TELEPHONE: (301) 663-7277; AUTOVON 343-7277

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Cranford, H.B.

NAME: POC:DA

21. GENERAL USE

Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code)

(U) Field Equipment; (U) Splint; (U) Leg Injury; (U) Medical

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To redesign the Military Standard Splint, Leg, Thomas, Half-Ring, Aluminum (NSN 6515-00-372-5100) so that it may be used on individuals of all sizes and provide improved patient comfort.

24. (U) Redesign the item IAW test and evaluation reports previously conducted, fabricate new prototypes and submit for evaluation.

25. (U) 7610 - 7709. OT II was conducted during 1Q FY77 and a report prepared. IPR convened in April 1977 recommended that the splints undergo additional operational testing. Additional OT II testing was completed during 4Q FY77.

*Available to contractors upon originator's approval.

U.S. ARMY LEG SPLINT

3S764717D832.00.009

Detail Sheet

1. BACKGROUND.

The U.S. Army Medical Bioengineering R&D Laboratory was assigned the task of redesigning the Military Standard Splint, Leg, Thomas, Half-Ring (NSN 6515-00-372-5100) on 9 August 1973.

The objective of this task was to redesign the Leg Splint so that it may be used on individuals of all sizes and provide improved patient comfort, reference 4a. The principal modifications resulted from an Evaluation Report of the Brooke Army Medical Center in October 1972, reference 4b. The findings of the report indicated the following deficiencies:

a. The Thomas Half-Ring Leg Splint did not fit an individual over six (6) feet tall.

b. Padding on the leg splint was insufficient to provide comfort to the wearer or prevent the inhibition of normal blood flow to the limb.

Engineering redesign was completed and reviewed by a Development Review Board Meeting, February 1975, reference 4c. The following modifications addressed the problem-areas noted above:

a. The Leg Splint was increased in length to accommodate a fully dressed 95th percentile man. This redesign provided an additional 5 3/4 inches to the existing splint when fully extended. In the collapsed configuration, the modified splint is 1 1/2 inches longer than the existing splint.

b. The padding of the Thomas Leg Splint has been redesigned to provide a wider contact area of support to the leg, to provide softer material and thereby increase patient comfort.

c. As a result of in-house tests, the locking collar of the Thomas Leg Splint is being replaced with a more effective locking mechanism. This provides infinite adjustment of splint length as well as a more secure lock between the telescoping components.

d. Four straps, three inches wide made of canvas, were added to each prototype to be used to immobilize the limb. The straps are adjustable and have hook and loop (Velcro) material to act as closure device.

Development Test (DT II) were conducted with the modified leg splint. Initial results were satisfactory except for two areas of deficiency. The strap attached to the ischial pad did not support the necessary forces. The closed-cell vinyl foam of the ischial pad, although soft, did not have the desired toughness or resiliency. The problems were corrected by selection of new materials. The leg strap was made of nylon webbing and the ischial pad of closed-cell neoprene foam coated with polyurethane. Retesting of these components was then completed, reference 4d.

During a Formal In-Process Review Meeting, reference 4e, it was agreed that the development effort proceed to Operational Test (OT II).

Having successfully completed the developmental effort of this task, twenty (20) prototypes were fabricated to be used during Operational Tests. Prototypes were shipped to the Medical Equipment Test and Evaluation, Academy of Health Sciences, Fort Sam Houston, Texas, during the first week of September 1976.

Operational Testing (OT II) of the splints was carried out during the first quarter of FY 77 (October through December 1976). A report of the operational testing was submitted to USAMRDC.

At the formal In-Process Review Meeting, it was agreed to resubmit the leg splint for additional operational testing.

The leg splints were shipped to the Medical Equipment Test and Evaluation Division, AHS, Fort Sam Houston, Texas, June 1977.

Additional operational testing of the leg splint was completed during the 4Q FY 77.

2. CONCLUSIONS.

Prototypes of a U.S. Army Leg Splint which meet the criteria of the requirements document, reference 4a, have been developed and tested. Development Test (DT II) have been performed and results of it have been documented. Operational Testing (OT II) of the prototype splints have been initiated. A technical data package of the device has been completed.

3. RECOMMENDATIONS.

None.

4. REFERENCES.

a. Letter Requirement (LR) for U.S. Army Leg Splint, 18 February 1976.

b. Report of Evaluation, Medical Sets, Kits and Outfits, 16 October 1972, Medical Equipment Test and Evaluation, Brooke Army Medical Center, Fort Sam Houston, Texas.

c. Minutes of Development Review Board Meeting, 10 February 1975, USAMBRDL.

d. Evaluation of Prototype Army Leg Splint Report No. MR 13-76, USAMBRDL.

e. Minutes and Recommendations of Formal In-Process Review, 22-26 March 1976.

f. Report of Operational Test II (OT II), U.S. Army Leg Splint and Case (MET&E Project No. 9-76), 31 January 1977.

g. Minutes of formal In-Process Review (IPR), 21-22 April 1977, USAMBRDL.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA 0B 6155	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISS'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
76 10 01	D. CHANGE	U	U	NA	NL	[X] YES [ ] NO	A. WORK UNIT

10. NO./CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	64717A	3S764717D832	00	010
b. CONTRIBUTING				
XXXXXXXXX	CARDS 1404R			

11. TITLE (Precede with Security Classification Code)*

(U) Dental Equipment Set, Light-Tray Unit, Field

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

009800 Medical and Hospital Equipment; 002400 Bioengineering

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7507	7806	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 77	0.2	13
FISCAL YEAR CURRENT 78	0.3	20

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

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20. PERFORMING ORGANIZATION

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PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* Malek, J.W.

TELEPHONE: (301) 663-7277; AUTOVON 343-7277

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Prensky, W.C.

NAME: POC:DA

21. GENERAL USE

Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Dental Portable Equipment; (U) Dental Field Sets; (U) Dental Operating Light; (U) Dental Field Equipment

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To develop a dental light, tray and stool unit packaged in a field container, which will provide field dental personnel with a modern piece of equipment as a replacement for the Light, Dental Operating, Field (NSN 6520-00-074-4581), an adjustable tray for over-the-patient delivery of operating instruments and medicaments, and a stool for assistant operating personnel.

24. (U) To fabricate a light pole and mounting bracket which is compatible with the Chair and Stool Unit, Dental Operating (NSN 6520-00-181-7349). The light, tray and stool components will be derived from presently type classified and/or currently available commercial source items. The set will be subjected to additional testing (operational and developmental).

25. (U) 7610 - 7709. OT II Testing by the 257th Medical Detachment (DS), Fort Jackson, SC, was completed and a report forwarded through channels. An IPR held 21-22 April 1977 recommended deletion of the stool from this set and the item (less stool) be type classified upon satisfactory logistical evaluation. Logistical and Maintenance evaluation was conducted by the National Maintenance Point, USAMMA and a report forwarded for comments.

*Available to contractors upon originator's approval.

DENTAL EQUIPMENT SET,
LIGHT-TRAY-STOOL UNIT, FIELD
3S764717D832.00.010

Detail Sheet

1. BACKGROUND.

This task was established to update and improve field dental care. Currently, field personnel have a new Dental Chair with Stool, but still use a Dental Light dating back to the 1950's. An over-the-patient delivery of instruments and medicaments is currently non-existent as the non-existence of a stool for assisting personnel.

This task was initiated under the 816 program and initial comments from field personnel were highly complimentary that data for the preparation of an Letter Requirement (LR) to develop this set was forwarded to the Combat Developer and Material Developer by the U.S. Army Medical R&D Command.

2. CONCLUSIONS.

Development has proven feasibility and acceptance with recommendations for type classification.

3. RECOMMENDATIONS.

Forward Technical Data (drawings and specifications) upon resolvement of the Logistical Evaluation.

4. REFERENCES.

a. Letter, SGRD-SDD, 3 July 1975.

b. Letter, SGRD-UBE-G, 17 July 1975.

c. DT I Test Evaluation, USAMBRDL, 28 May 1976.

d. OT I Test Evaluation, USAIDR, 2 June 1976.

e. LR, HSA-CDM, dated 29 April 1976.

f. DT II Test Evaluation, USAMBRDL, 28 October 1976.

g. OT II Test Evaluation, USAMMA-TD, 28 December 1976.

h. Minutes of Meeting, IPR, 21-22 April 1977.

i. Logistical Evaluation, USAMMA-MP, 20 June 1977.

j. Letter, SGRD-UBE-G, 26 August 1977.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA 0B 6050	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
76 10 01	D. CHANGE	U	U	NA	NL	[X] YES [ ] NO	A. WORK UNIT

10. NO./CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	64717A	3S764717D832	00	011
b. CONTRIBUTING				
XXXXXXXXX	CARDS 149D	(25)		

11. TITLE (Precede with Security Classification Code)*

(U) Extractor, Medical Oxygen System, Individual Patient, System Design

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

002400 Bioengineering; 008800 Life Support; 009800 Medical and Hospital Equipment

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7403	7809	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR	PRECEDING 77	0.1	06
	CURRENT 78	0.3	15

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

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TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* Cranford, H.B.

TELEPHONE: (301) 663-7277; AUTOVON 343-7277

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME:

NAME:

21. GENERAL USE

Foreign Intelligence Not Applicable

POC:DA

22. KEYWORDS (Precede EACH with Security Classification Code)

(U) Oxygen; (U) Extractor; (U) Individual Patient; (U) Medical

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To conduct an in-depth study in preparation of obtaining a system to extract oxygen from the atmosphere for an individual patient thus eliminating the need for bottled gas.

24. (U) Analyze all currently known methods (operational and developmental) for producing and delivering medical oxygen at a patient's bedside or at an operating room table.

25. (U) 7610 - 7709. Aircraft Oxygen Generating Systems being evaluated by the Naval Air Development Test Center and USAARL, Fort Rucker, Alabama, indicate state-of-the-art equipment cannot meet all of the Army's requirements for an individual patient medical oxygen extractor system.

*Available to contractors upon originator's approval.

EXTRACTOR, MEDICAL OXYGEN SYSTEM, INDIVIDUAL
PATIENT, SYSTEM DESIGN

3S764717D832.00.011

Detail Sheet

1. BACKGROUND.

The work unit, Individual Patient Medical Oxygen System Extractor was established on 13 May 1974 (reference 4b). The objective of the work unit is to recommend candidate system designs with the greatest potential of achieving the desired characteristics, stated in the Material Need Document (reference 4a).

Technical literature was reviewed and manufacturers contacted to acquire pertinent data. During the course of the evaluation several trips were made to evaluate equipment and/or discuss technical approaches. Feasibility studies were performed in-house to evaluate two possible technical approaches (References 4c and 4d). The data was presented before a Development Review Board Meeting, 10 February 1975 (reference 4e). The conclusions stated that currently no commercial unit or one presently in the R&D phase can meet all of the Army's requirements (reference 4a). The Army Aviation Command, Navy, and Air Force are currently funding R&D efforts to design and build similar types of equipment for aircraft on-board oxygen system. It was recommended that these programs be monitored so that the data generated would allow the USAMRDC to decide on the best system.

A proposed report was forwarded to USAMRDC (reference 4g) requesting that the task remain open to monitor on-going R&D efforts. The request was approved (reference 4h) with instructions to publish a Technical Report. The Technical Report (reference 4f) was forwarded for approval by USAMBRDL on 27 June 1975 (reference 4i).

A letter from the Academy of Health Sciences, 10 May 1976, (reference 4j) stated the technology existed to meet the Army's requirements and proposed a concept formulation package and COEA. USAMBRDL replied (reference 4k), it would be premature to attempt such action at this time due to insufficient data from the Navy and Air Force for R&D programs in the areas of safety, reliability, degradation, rates of chemicals, power, physical size and weight.

Two contractors presented briefings to the USAMRDC as to the capabilities of their oxygen generating equipment: AiResearch, 29 April 1976; and Bendix Corporation, 4 August 1976. Neither contractor has equipment that will meet all of the Army's requirements, although many of the requirements can be met.

Two Aircraft prototype units, under development by AiResearch, were examined by USAMBRDL personnel during the 8-9 September 1976 meeting between the Air Force and AiResearch (reference 41). USAMBRDL was an observer. The units do not meet all of the USAMRDC requirements at this time.

2. CONCLUSIONS.

The equipment under development for the Army, Navy, and Air Force Aircraft, can meet many of the requirements of reference 4a. The area of greatest difficulty is the requirement for 99.5% O_2. The equipment that is capable is complex, power expensive, and not completely proven. The equipment that is capable of providing 90-95% O_2 is more reliable and in general requires less power.

3. RECOMMENDATIONS.

Continue to monitor equipment currently under development to obtain present and future technical capabilities; perform trade-off evaluations to determine what requirements, if any, can be eased to allow use of existing technologies.

4. REFERENCES.

a. Letter, United States Army Combat Development Command, Fort Belvoir, Virginia, CDCMS-O, 9 February 1974, subject: Department of the Army Approved Material Need (ED) (SDR) for an Extractor, Medical Oxygen System, Individual Patient, CDOG, Paragraph 149d (25).

b. Letter, U.S. Army Medical Research and Development Command, Washington, D.C., SGRD-SDM, 13 March 1974, subject: Extractor, Medical Oxygen System, Individual Patient.

c. Small, Mitchell J., "Feasibility Study of the Production of High-Purity Oxygen from Air by a Solubility Differential Process:" Work Unit 5F505, U.S. Army Medical Bioengineering Research and Development Laboratory, Fort Detrick, Frederick, Maryland, 3 January 1975.

d. Small, Mitchell J., "Permeable Membrane Purification of Oxygen from Air", Project 5F505, U.S. Army Medical Bioengineering Research and Development Laboratory, Fort Detrick, Frederick, Maryland, 7 February 1975.

e. Meeting, Minutes of DRB, 75-3, U.S. Army Medical Bioengineering Research and Development Laboratory, Fort Detrick, Frederick, Maryland, SGRD-UBE, 10 February 1975, subject: "Engineering Division Development Review Board Meeting".

f. Cranford, H. Bruce, Jr., "Candidate Medical Oxygen Extractor System", TR 7505, DDC, AD-B005719L, U.S. Army Medical Bioengineering Research and Development Laboratory, Fort Detrick, Frederick, Maryland, April 1975.

g. Letter, U.S. Army Medical Bioengineering Research and Development Laboratory, Fort Detrick, Frederick, Maryland, SGRD-UBE-G, 12 May 1975, subject: Extractor, Medical Oxygen System, Individual Patient.

h. Letter, U.S. Army Medical Research and Development Command, Washington, D.C., SGRD-SDM, 27 June 1975, subject: Extractor, Medical Oxygen System, Individual Patient, Work Unit 832.00.011.

i. Letter, U.S. Army Medical Bioengineering Research and Development Laboratory, Fort Detrick, Frederick, Maryland, SGRD-UBE-G, 27 July 1975, subject: Extractor, Medical Oxygen System, Individual Patient, Work Unit 832.00.011.

j. Letter, Academy of Health Sciences, United States Army, Fort Sam Houston, Texas, HSA-CDM, 10 May 1976, subject: Evaluation of Alternatives for Satisfying the SDR for Oxygen Extractor, ACN: 16736.

k. Letter, U.S. Army Medical Bioengineering Research and Development Laboratory, Fort Detrick, Frederick, Maryland, SGRD-UBE-G, 3 June 1976, subject: Evaluation of Alternatives for Satisfying the SDR for Oxygen Extractor, ACN: 16736, Task No. 832.00.011.

l. Trip Report, USAMBRDL, 8-9 September 1976, subject: To Attend USAF Sponsored Conference on Oxygen Extractor for the B-1 Bomber.

m. Trip Report, USAMBRDL, 12-13 October 1976, subject: To Observe and Evaluate Oxygen Equipment Developed for USAARC, Fort Rucker, Alabama, dated 21 October 1976.

n. Trip Report, USAMBRDL, 2 December 1976, subject: To Observe and Evaluate Oxygen Generating Equipment Developed for the Navy, Naval Air Development Center, Warminster, Pennsylvania, dated 8 December 1976.

o. Letter, USAMBRDL, SGRD-UBE-G, dated 18 February 1977, subject: Membrane Oxygenator.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA 0A 6230	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
76 10 01	D. CHANGE	U	U	NA	NL	[X] YES [ ] NO	A. WORK UNIT

10. NO./CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	64717A	3S764717D832	00	012
b. CONTRIBUTING				
XXXXXXXXX	CARDS 1402R			

11. TITLE (Precede with Security Classification Code)*

(U) Optometry Set, Field, Combat

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

009800 Medical and Hospital Equipment; 002400 Bioengineering

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7405	7906	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 77	1.0	49
FISCAL YEAR CURRENT 78	0.9	45

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

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20. PERFORMING ORGANIZATION

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PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* Cranford, H.B.

TELEPHONE: (301) 663-7277; AUTOVON 343-7277

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Patzer, N.H.

NAME: POC:DA

21. GENERAL USE

Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code)

(U) Field Set; (U) Field Optometry; (U) Combat Set; (U) Optometry Set

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To modernize and update the field optometry set and to replace components which are no longer available from commercial sources with new designs.

24. (U) Design and fabrication of engineering development prototypes for Developing Test (DT II) and Operational Testing (OT II).

25. (U) 7610 - 7709. The Development Test II (DT II) was completed. The chair shipping container failed the Rain Test. The accessory container failed the Rain and Drop Test. The contents were not damaged. Modifications to the containers have been initiated.

*Available to contractors upon originator's approval.

FIELD COMBAT OPTOMETRY SET

3S764717D832.00.012

Detail Sheet

1. BACKGROUND.

The object of the Field Combat Optometry Set task is to update Set (NSN 6545-00-926-9061) and replace the Field Portable Ophthalmic Instrument Stand (NSN 6515-00-877-6460), which is no longer manufactured and the Portable Dental Operating Chair and Stool (NSN 6520-00-181-7349) which is unsatisfactory for ophthalmic examinations.

The Academy of Health Sciences established the Technical Requirements (reference 4a) on 28 March 1974. USAMBRDL reviewed the requirements. Several changes were recommended (reference 4b), the major one being that a hydraulic system not be eliminated from consideration in the design of the replacement chair assembly. The Academy concurred with the recommendation of reference 4c. The task was established at USAMBRDL by USAMRDC on 2 May 1974 (reference 4d), Task No. 3A1062110A816.00.023.

To better understand the functions of the Optometrist and equipment, observations were made at the Walter Reed Ophthalmic Clinic on 31 July 1974 (reference 4e). The design and fabrication of the breadboard was started to replace the chair and stand and necessary parts were ordered to assemble a complete set. On 8 July 1976, the Optometry Set was assigned one of the five top priority projects in the Laboratory (reference 4f). A DRB (reference 4g) was held to review the status of the program. Several design changes and improvements were made to the breadboard. The DRB stated that the breadboard had been demonstrated to the Ocular Consultants after the informal IPR in June 1975, and met with their preliminary approval. Prototype design and fabrication of 3 units for DT II and OT I were started in July 1975. On 23 July 1975 (reference 4h), USAMRDC indicated LTC Hudgins, Fort Bragg, North Carolina, was to perform OT I at USAMBRDL, 11-15 August 1975.

After the OT I, USAMRDC (reference 4i), directed that the recommended changes be incorporated into the prototypes. In addition, a Major Barron and SSG Johnson, viewed the breadboard on 8 October 1975 and recommended changes (reference 4j), which were approved by USAMRDC (reference 4k). As a result of the changes and delays in obtaining long lead time items, it became obvious the schedule established by the July 1975 letter (reference 4f), could not be met. A new schedule was established on 4 November 1975 (reference 4l).

The Academy Health Sciences Draft LR was reviewed by USAMBRDL and comments forwarded to USAMRDC (reference 4m). Considerable discussion arose about the weights of the containers. AHS felt the weights of the two containers should be reduced to allow two man carry. USAMRDC and USAMBRDL felt the containers were designed in accordance with MIL-STD-1472 and the USAMRDC Draft LR. The containers require a four man carry and have sufficient handles for that purpose. USAMBRDL presented alternate designs to reduce weight of the containers, but none were acceptable to the Joint Working Group (reference 4n). The Joint Working Group recommended the Draft LR with changes be approved and currently fabricated prototype Optometry Set undergo OT II.

The LR was approved on 4 June 1976 (reference 4o). At that time the Task A816.00.023 was terminated and a new Task D832.00.012 Field Combat Optometry Set was established. Prototype fabrication of three units was completed in May 1976. The Development Test (DT II) Plan (reference 4p) was written and later approved 10 August 1976 (reference 4q).

2. CONCLUSIONS.

The Field Combat Optometry Set Shipping Containers did not meet all the requirements of the LR.

3. RECOMMENDATIONS.

Modify container design to pass the Rain and Drop Test and submit prototype for Operational Test (OT II).

4. REFERENCES.

a. Letter, Academy of Health Sciences, U.S. Army, Fort Sam Houston, Texas, AHS-DMA, 28 March 1974, subject: Recommended changes for the Optometry Set, Field, Combat (FSN 6545-00-926-9061).

b. Letter, U.S. Army MBRDL, Fort Detrick, Frederick, MD, SGRD-UBE-G, 17 April 1974, subject: Recommended Changes for the Optometry Set, Field Combat (FSN 6545-00-926-9061).

c. Letter, Academy of Health Sciences, U.S. Army, Fort Sam Houston, Texas, AHS-DMA, 13 May 1974, subject: Recommended Changes for the Optometry Set, Field, Combat (FSN 6545-00-926-9061).

d. Letter, U.S. Army Medical Research and Development Command, Washington, D.C., SGRD-SDM, 2 May 1974, subject: Optometry Set, Field Combat (FSN 6545-00-926-9061).

e. Trip Report, USAMBRDL, Fort Detrick, Frederick, MD, B. Cranford, 2 August 1974, subject: To Observe Use and Obtain Comments on Phoropter and Related Ophthalmic Equipment.

f. Letter, USAMRDC, Washington, D.C., SGRD-SDM, 8 July 1975, subject: FY 76 Type Classification Program.

g. Meeting, USAMBRDL, Fort Detrick, Frederick, MD, SGRD-UBE, 22 July 1975, subject: Engineering Division Development Review Board Meeting, No. 75-5.

h. FONECON between USAMRDC, (SGRD-SDM/MAJ Kovach) and USAMBRDL, General Engineering Branch (B. Cranford), 23 July 1975, subject: Field Combat Optometry Set.

i. Letter, USAMRDC, Washington, D.C., SGRD-SDM, 4 September 1975, subject: Report of Visit.

j. Letter, Fitzsimons Army Medical Center, Denver, Colorado, HSF-OFL, 16 October 1975, subject: Evaluation of Optical Field Equipment.

k. D/F, USAMBRDL, SGRD-UBE-G, 22 October 1975, subject: Meeting on Optometry Set, Task 816.00.023.

l. Letter, USAMRDC, Washington, D.C., SGRD-SDM, 6 November 1975, subject: Minutes for Meeting on Priority Type Classification Items.

m. Memorandum, USAMBRDL, SGRD-UBE-G, 28 January 1976, subject: Optometry Set, Field Combat, Task No. A816.00.023.

n. Letter, USAMRDC, SGRD-SDM, 7 April 1976, subject: Minutes and Recommendations of Joint Working Group (JWG), 24-26 March 1976.

o. Letter, Academy of Health Sciences, Fort Sam Houston, Texas, HSA-CDM, 4 June 1976, subject: Letter Requirements (LR) for an Optometry Set, Field, Combat.

p. Cranford, H. Bruce, Jr., Development Test Plan (DT II) Field Combat Optometry Set, Task No. D832.00.012, USAMBRDL, Fort Detrick, Frederick, MD, July 1976.

q. Letter, USAMRDC, SGRD-SDM, 10 August 1976, (12 July 76) 1st Ind., subject: Field Combat Optometry Set.

r. Hodge, J. W., et al, "Development Test (DT II) of Field Combat Optometry Set", Task No. D832.00.012, MR 17-76, 9 December 1976, USAMBRDL.

s. Letter, subject: Maintenance Evaluation of Optometry Set, Field, Combat and Container, Shipping Multipurpose Canine", DA, USAMMA, 8 March 1977.

t. Letter, subject: Optometry Set, Field, Combat, Task No. D832.00.012, USAMBRDL, SGRD-UBE-G, dated 9 March 1977.

u. Letter, subject: Plan of Operational Test II (OT II), Field, Combat Optometry Set (MET&E Project No. 8-77), Task No. 832.00.018, USAMBRDL, SGRD-UBE-G, 28 September 1977.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA 0A 6205	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
76 10 01	D. CHANGE	U	U	NA	NL	[X] YES [ ] NO	A. WORK UNIT

10. NO./CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	64717A	3S764717D832	00	013
b. CONTRIBUTING				
XXXXXXXXX	CARDS 1439D	(03)		

11. TITLE (Precede with Security Classification Code)*

(U) Sanitation Complex (Evacuation and Combat Support Hospital)

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

008800 Life Support; 007800 Hygiene and Sanitation

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7405	7903	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR	PRECEDING 77	0.8	41
	CURRENT 78	2.2	150

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

NAME: Dettor, C.M., COL

TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* Patzer, N.H.

TELEPHONE: (301) 663-7277; AUTOVON 343-7277

SOCIAL SECURITY ACCOUNT NUMBER:

21. GENERAL USE

Foreign Intelligence Not Applicable

ASSOCIATE INVESTIGATORS

NAME: Crampton, K.T. POC:DA

NAME:

22. KEYWORDS (Precede EACH with Security Classification Code)

(U) MUST; (U) Hospital; (U) Evacuation; (U) Combat Support; (U) Sanitation

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To evaluate and comment on the contractor's effort to design and fabricate a sanitation complex (latrine, washroom and shower facilities and waste incinerator) in accordance with the requirements of the QMR. This sanitation complex is intended for use by US Army Medical Field units. To modify prototype in accordance with recommendations and evaluate.

24. (U) Compare the contractor's configuration to the requirements of the QMR and modify the prototype to meet the requirements.

25. (U) 7610 - 7709. The 100 hour test of the AiResearch Human Waste Incinerator has been completed and report published. The OT II Test of the lavatory and shower was completed and report published. Later, both units were modified to eliminate deficiencies reported in the OT II and used in a 2 week field training exercise by the 10th CSH, Fort Meade, Maryland. Further modification of both units to finalize the design will begin in 1Q FY78.

*Available to contractors upon originator's approval.

SANITATION COMPLEX (EVACUATION AND COMBAT SUPPORT HOSPITAL)

3S764717D832.00.013

Detail Sheet

1. BACKGROUND.

In April of 1974 the U.S. Army Medical Bioengineering Research and Development Laboratory was assigned the task of Evaluating the MUST Sanitation Complex. The performance was to be evaluated against the essential elements of the Qualitative Material Requirement (QMR) Document.

The Sanitation Complex (utility element) is composed of a Lavatory Kit, Shower Kit and Toilet Kit. Each kit is to be installed in a Ward Service Container. In addition, there is a Human Waste Incinerator for the Toilet Kit.

During the In-Process Review of 22 March 1976, it was decided to use the U.S. Army General Equipment Test Activity (GETA) Test as the DT II for the Shower and Lavatory Kit. It was also agreed that Operational Test II (OT II) would be conducted as scheduled and a Development Test III (DT III) would be scheduled to test all changes since the GETA Test.

The Amertech and AiResearch Human Waste Incinerators have completed 100 tests and reports published.

The OT II Test of the Shower Kit and Lavatory Kit has been completed and report published. Recommended corrective actions were made. In July 1977, the corrected units were used in a two week field training exercise by the 10th CSH, Fort Meade, Maryland.

2. CONCLUSIONS.

Testing of the Lavatory Kit and Shower Kit have demonstrated the feasibility of the concept for these elements of the Sanitation Complex.

Minor revision of the sump pump and sump in the Lavatory Kit will be required to complete the final design.

Further development will be required to complete the final design of the Shower Kit. Revision of the shower head, sump pump, sump, and shower receptors will be required.

Both the AiResearch and the Amertech Human Waste Invinerators have had acceptable performance in the 100 hour tests. They vary in mode of operation and maintenance characteristics. Further development should await the completion of the redesign of the Toilet Kit.

3. RECOMMENDATIONS.

Complete revisions of the Lavatory and Shower and initiate Development Test III. Complete the redesign of the Toilet and fabricate an engineering development prototype for development and operational testing.

4. REFERENCES.

a. DA Approved Qualitative Materiel Requirement for MUST Annex B - Water and Waste Management Subsystem, March 1970.

b. MUST Sanitation Complex Evaluation Report, USAMBRDL, June 1974.

c. Minutes and Recommendations, Informal IPR, 10-12 June 1975.

d. Action Report - RE: Shower and Lavatory Units, 10th Combat Support Hospital, 18 September 1975.

e. Test Report MR 29-75, USAMBRDL, Amertech Human Waste Incinerator, Serial No. 0001, John W. Hodge, September 1975.

f. Minutes of Formal Special IPR, 22 March 1976.

g. Letter Report, Operational Test II, Shower and Lavatory Elements of MUST Sanitation Complex (MET&E Project No. 18-75), SGMMA-TD, May 1977.

h. Test Report MR 11-77, USAMBRDL, Incinerator, Human Waste, AiResearch P-1, Developmental Test, John W. Hodge, July 1977.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA 0B 6062	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
76 10 01	D. CHANGE	U	U	NA	NL	[X] YES [ ] NO	A. WORK UNIT

10. NO./CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	64717A	3S764717D832	00	018
b. CONTRIBUTING				
XXXXXXXXXX	CARDS 1664			

11. TITLE (Precede with Security Classification Code)*

(U) Military Dog Shipping Multipurpose Container

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

009800 Medical and Hospital Equipment; 002400 Bioengineering

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7505	7806	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR	PRECEDING 77	0.4	26
	CURRENT 78	0.9	45

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

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RESPONSIBLE INDIVIDUAL

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20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

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PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* Cranford, H.B.

TELEPHONE: (301) 663-7277; AUTOVON 343-7277

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: O'Connor, R.J.

NAME: POC:DA

21. GENERAL USE

Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code)

(U) Veterinary; (U) Dogs; (U) Shipping Container; (U) Transportation; (U) Rabies; (U) Cage

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To develop a lightweight, portable, rugged, collapsible, lock-in-place, nesting, easily sanitized and maintainable, multipurpose container. The item will serve for shipping military dogs worldwide; temporary housing; secure confinement for quarantining rabies suspect animals and a cage for other animals of military dog size.

24. (U) Design, fabricate, test, and evaluate items to meet the military requirements for a suitable container.

25. (U) 7610 - 7709. The containers successfully completed Development Test (DT II) and Operational Test (OT II) and the item has been recommended for Type Classification. Preparation of the technical data package has been initiated.

*Available to contractors upon originator's approval.

MILITARY DOG SHIPPING MULTIPURPOSE CONTAINER

3S764717D832.00.018

Detail Sheet

1. BACKGROUND.

This task was established on 5 May 1975 (references 4a and 4b) as a follow onto Task A816.14.019.

The purpose of the task is to develop a Multipurpose Shipping Container for use in shipping military dogs worldwide, as temporary housing, as secure confinement for quarantining rabies suspect animals, and as a cage to house other animals of military dog size. The container is to be lightweight, portable, rugged, collapsible, nested, easily sanitized, and maintainable.

Prototype containers and Project File A816.14.019, containing Operational Test (OT I) results, were evaluated resulting in three problems requiring resolution: (a) patent infringement; (b) 2" dimension variation; and (c) weight reduction.

(a) The question of patent infringement arose when the prototype containers built by Church Metal Spinning Company, which are covered by two patents, did not perform as desired. Consequently MERDL built its own prototype container under A816.14.019, during 1970-1971. The intent was to incorporate necessary changes into the Church Metal Containers which may not be covered by existing patents. Since the MERDL container is very similar to the Church Metal Container, the Judge Advocate Office was asked for a decision on possible patent infringement. The problem was addressed in reference 4c, in which the conclusion stated"...., there would seem to be no reason why USAMBRDL should delay in its decision to proceed with the IPR as planned." In addition, the letter presented several methods on how the problems could be resolved through various legal channels. The IPR (reference 4d) decided to continue with the development of the containers.

(b) During the OT I, it was recommended that containers be reduced in length by two (2) inches to allow denser packing on Air Force standard pallets. A review of the subject on 19 December 1975, did not support the recommendations, therefore, the containers retained their original dimensions.

(c) The MERDL container could not meet the weight requirement of the ROC (reference 4b). A weight reduction analysis was performed and presented at the 22 July 1975 DRB (reference 4f). The changes were

approved which reduced the weight of the container to 120 pounds which is below the 125 pounds maximum allowed in the ROC. Additional changes were made to improve the reliability and maintainability.

The Informal IPR (reference 4d) was convened on 10-12 June 1975 to review the status of the task. It directed USAMBRDL to fabricate four canine multipurpose shipping containers incorporating weight reduction changes. The Development Plan (reference 4g) with modifications was approved. The IPR also requested a dog shipping container be loaded on a DC-9 aircraft, since this aircraft is used to transport dogs within CONUS. The loading test (reference 4e) concluded the MERDL dog shipping container cannot be loaded into the storage compartment of the DC-9 aircraft since the assembled container will not fit thru the baggage door. The R&D Command concluded (reference 4e) that since the cross country and overseas flights are made in C-141 type aircraft, which can accommodate the MERDL container, the container would not be changed.

On 15 January 1976 (reference 4h) the Veterinary Consultant, Colonel Ramsey viewed the new prototype and approved the weight reduction changes of the DRB (reference 4f). Additional changes were recommended which Colonel Ramsey wanted to view prior to the fabrication of the prototypes for DT II and OT II tests.

One USAMBRDL prototype container was fabricated for the 22 March 1976 IPR (reference 4i). The additional changes were viewed and approved by Colonel Ramsey during the IPR, at which time the IPR authorized the construction of four (4) additional containers for DT II and OT II. The four (4) USAMBRDL containers were fabricated by the end of May 1976.

The Development Test Plan (DT II) (reference 4j) was approved on 6 May 1976 (reference 4k) and testing started the end of May 1976. The Technical Manual (reference 4l) was finished the end of May 1976.

Four containers were shipped to Aberdeen Proving Grounds to transport pups to Kelly Air Force Base as part of the OT II test by Medical Equipment Test and Evaluation Division, USAMMA, Fort Sam Houston, Texas (reference 4m). A Letter Report (reference 4n) of the operation was forwarded to USAMBRDL. The four containers were returned to this Laboratory on 6 August 1976 to allow completion of DT II. The containers were slightly damaged and were repaired and refurnished by the Laboratory.

2. CONCLUSIONS.

The Canine Multipurpose Shipping Containers meet the requirements of the ROC.

3. RECOMMENDATIONS.

Complete preparation of technical data package for type classification.

4. REFERENCES.

a. Letter, Academy of Health Sciences, United States Army, Fort Sam Houston, Texas, HSA-CDM, 16 March 1975, subject: Required Operational Capability (ROC) for a Military Dog Shipping Multipurpose Container.

b. Letter, U.S. Army Medical Research and Development Command, Washington, D.C., SGRD-SDM, 18 April 1975, subject: Required Operational Capability (ROC) for a Military Dog Shipping Multipurpose Container.

c. Letter, U.S. Army Medical Research and Development Command, Washington, D.C., SGRD-SSJ, 29 May 1975, subject: Military Dog Shipping Multipurpose Container.

d. Letter, U.S. Army Medical Research and Development Command, Washington, D.C., SGRD-SDM, 2 July 1975, subject: Minutes and Recommendations Informal In-Process Review (IPR), 10-12 June 1975.

e. Letter, Department of the Army Office of the Surgeon General, Washington, D.C., SGRD-SDM, 14 July 1975, subject: Loading Test of the Military Dog Shipping Multipurpose Container Aboard a DC-9 Aircraft.

f. Meeting, U.S. Army Medical Bioengineering Research and Development Laboratory, Fort Detrick, Frederick, Maryland, SGRD-UBE, 22 July 1975, subject: Engineering Division Development Review Board (DRB) Meeting.

g. Development Plan, U.S. Army Medical Research and Development Command, Washington, D.C., SGRD-SDM, 7 August 1975, subject: Development Plan for Military Dog Shipping Multipurpose Container.

h. Memorandum for Record, U.S. Army Medical Bioengineering Research and Development Laboratory, Fort Detrick, Frederick, Maryland, SGRD-UBE-G, 19 January 1976, subject: Military Dog Shipping Multipurpose Container.

i. Letter, U.S. Army Medical Research and Development Command, Washington, D.C., SGRD-SDM, 7 April 1976, subject: Minutes of Formal Special In-Process Review (IPR), 22 March 1976.

j. Cranford, H. B., Jr., "Development Test Plan (DT II) Canine Multipurpose Shipping Container, Task No. D832.00.018, March 1976", U.S. Army Medical Bioengineering Research and Development Laboratory, Fort Detrick, Frederick, Maryland.

k. Letter, U.S. Army Medical Research and Development Command, Washington, D.C., 6 May 1976, subject: Canine Multipurpose Shipping Container, Task No. D832.00.018, SGRD-SDM (23 Mar 76) 1st Ind.

l. Manual: "Operators, Organizational and Direct Support Manual for Canine Multipurpose Shipping Container", U.S. Army Medical Bioengineering Research and Development Laboratory, Fort Detrick, Frederick, Maryland, May 1976.

m. Shipment Request, U.S. Army Medical Bioengineering Research and Development Laboratory, Fort Detrick, Frederick, Maryland, USAMBRDL Form 113, 27 May 1976.

n. Letter, Medical Equipment Test and Evaluation Division, U.S. Army Medical Material Agency, Fort Sam Houston, Texas, SGMMA-TD, 14 June 1976, subject: Canine Multipurpose Shipping Container.

o. Hodge, J. W., et al., "Developmental Test (DT II) of Canine Multipurpose Shipping Container, Task No. D832.00.018", 27 October 1976, U.S. Army Medical Bioengineering Research and Development Laboratory, Fort Detrick, Frederick, Maryland 21701.

p. Letter, DA, Army Medical Materiel Agency, Frederick, Maryland, SGMMA-MP, 26 January 1977, subject: Maintenance Evaluation of Optometry Set, Field, Combat and Container, Shipping Multipurpose Canine.

q. Flammia, H. W., "Report of Operational Test II (OT II) Container, Shipping, Multipurpose, Canine (MET&E Project No. 10-76), 5 May 1977, Department of the Army, Army Medical Materiel Agency, Medical Equipment Test and Evaluation Division, Fort Sam Houston, Texas 78234.

r. Letter, U.S. Army Medical Research and Development Command, Washington, D.C., SGRD-OPM, 29 July 1977, subject: Report of Operational Test II (OT II) Container, Shipping, Multipurpose, Canine.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA 0B 6061	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISB'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
76 10 01	D. CHANGE	U	U	NA	NL	☒ YES ☐ NO	A. WORK UNIT

10. NO./CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	64717A	3S764717D832	00	019
b. CONTRIBUTING				
XXXXXXXXX	CARDS 11439D	(03)		

11. TITLE (Precede with Security Classification Code)*

(U) Accessory Kit MUST Service Ward Container

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

009800 Medical and Hospital Equipment; 008800 Life Support

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7506	7809	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 77	0.3	21
FISCAL YEAR CURRENT 78	0.5	60

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

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TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

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NAME:* Patzer, N.H.

TELEPHONE: (301) 663-7277; AUTOVON 343-7277

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Crampton, K.T.

NAME: POC:DA

21. GENERAL USE

Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code)

(U) Accessory; (U) Utilities; (U) Ward Container; (U) MUST

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To develop an accessory kit for the MUST service ward container which will provide for control and distribution of the basic utilities; air, water, light and electrical power; when used as a general shelter.

24. (U) Analysis of the functional requirements for the kit will be conducted to establish an optimal configuration of the components. A value engineering study of these components will follow to insure functional suitability and a broad competitive base. An up-to-date drawing/data package will be prepared for the revised accessory kit.

25. (U) 7610 - 7709. A technical report listing the components of the kit was issued. Assembly of the kit for evaluation has been initiated.

*Available to contractors upon originator's approval.

ACCESSORY KIT MUST SERVICE WARD CONTAINER

3S764717D832.00.019

Detail Sheet

1. BACKGROUND.

The first accessory kit for the Ward Service Container was developed as a component of the prototype Sanitation Complex in the late 1960's. On 16 April 1975, a task was initiated to develop the kit as a separate item.

The original kits were used and tested as part of the prototype MUST Sanitation Complex. This includes: the U.S. Army General Equipment Test Activity (GETA) Tests in June 1971; the Field Training Exercise of the 10th Combat Support Hospital (CSH) in September 1975; the OT II Test of the MUST Lavatory and Shower in November 1976; and in the Field Training Exercise of the 10th CSH in July of 1977.

Current and potential uses of the Ward Service Container, now named the MUST Multi-Purpose Shelter (MPS), were analyzed and a Technical Report issued listing the required components for the Accessory Kit. The assembly of the kit for evaluation has been initiated.

2. CONCLUSIONS.

The feasibility of the kit has been demonstrated in previous testing. Evaluation of the kit should proceed.

3. RECOMMENDATIONS.

The current work unit should be completed and the kit should be submitted for type classification.

4. REFERENCES.

a. Letter, Initiating a Review and Procurement Package at NARADCOM, DASG-HCL, Accessory Kit MUST Service Ward Container, 13 June 1973.

b. Letter establishing the work unit, SGRD-SDM, MUST Service Ward Container, 26 July 1976.

c. Technical Report No. 77 05, USAMBRDL, Accessory Kit Multi-Purpose Shelter MUST, Neil H. Patzer, April 1977.

d. Letter Report, Operational Test II, Shower and Lavoratory Elements of MUST Sanitation Complex (MET&E Project No. 18-75), SGMMA-TD, May 1977.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA 0B 6052	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
76 10 01	D. CHANGE	U	U	NA	NL	☒ YES ☐ NO	A. WORK UNIT

10. NO./CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	64717A	3S764717D832	00	020
b. CONTRIBUTING				
XXXXXXXXXX	CARDS 1439D	(3)		

11. TITLE (Precede with Security Classification Code)*

(U) Food Service Army TOE Hospital (Combat Support-Evacuation)

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

009800 Medical and Hospital Equipment; 006500 Food

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7505	CONT	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 77	0.1	03
FISCAL YEAR CURRENT 78	0.1	15

19. RESPONSIBLE DOD ORGANIZATION

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20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* Salisbury, L.L.

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SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME:

NAME: POC:DA

21. GENERAL USE

Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code)

(U) Food Service; (U) Evacuation Hospital; (U) Combat Support Hospital; (U) MUST

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To evaluate and fabricate an efficient patient food service subsystem for Medical Unit Self-Contained Transportable (MUST) system.

24. (U) The food service prototype equipment will be evaluated relative to revised QMR for MUST. This action will require weight reduction considerations and value engineering of the food service components.

25. (U) 7610 - 7709. Designated food service items requiring further design efforts have been returned to NARADCOM. Other serving and preparation items have been distributed locally. Currently awaiting shipping instructions from USAMMA on shelter items. USAMBRDL will continue to monitor NARADCOM program.

*Available to contractors upon originator's approval.

FOOD SERVICE ARMY TOE HOSPITAL

(COMBAT SUPPORT-EVACUATION)

3S764717D832.00.020

Detail Sheet

1. BACKGROUND.

The MUST Food Service Complex was referred to this Laboratory by the R&D Command, 1 July 1975, for Value Engineering Study. The principle objective was to reduce the weight of the complex without degrading its capabilities. The total complex including containers weighs over 33,000 pounds with 80% of this weight not food service related.

A report was submitted in October 1975, in which three options were identified. Option One proposed eliminating non-essential equipment and the substitution of smaller, lighter equipment for some other items. This option resulted in a 6% savings of weight.

Option Two included all items of option one plus the redesign of a number of pieces of equipment for multi-use and or weight reduction. This would have resulted in a total savings of 7.5% of the weight.

Option Three proposed a re-evaluation of the food service requirements in anticipation of food technology developments by 1985.

Acting on the report, the Surgeon General has requested NARADCOM to initiate a program for the development of a new MUST food service (Option Three).

An inventory of food service related items, of shelter related items, and hospital related items, has been prepared and submitted through channels.

A number of food service items have been sent to NARADCOM (references 4f and 4g). Swaiting instructions from USAMMA (SGMMA-IIOI) for return of shelters (reference 4h).

2. CONCLUSIONS.

Disposition of all items is awaiting directions from higher authority.

3. RECOMMENDATIONS.

None.

4. REFERENCES.

a. Engineering Test of Food Service Sub-system of Medical Unit, Self-Container, Transportable, U.S. Army General Equipment Test Activity, Fort Lee, Virginia, June 1971.

b. Report of Expanded Service Test, Medical Equipment Test and Evaluation Division, U.S. Army Medical Field Service School, Fort Sam Houston, Texas, 4 May 1972.

c. Report of Check Test, Medical Equipment Test and Evaluation Division, U.S. Army Medical Materiel Agency, Fort Sam Houston, Texas, 18 October 1974.

d. Letter, SGRD-SDM, dated 20 March 1975.

e. Food Service, Army TOE Hospital, Preliminary Value Engineering Study, US Army Medical Bioengineering R&D Laboratory, TR 71 51, October 1975.

f. Letter, SGRD-SDM, dated 22 October 1976.

g. Letter, SGRD-SDM, dated 15 November 1976.

h. Letter, SGRD-OPM, dated 15 July 1977.

IN-HOUSE LABORATORY INDEPENDENT RESEARCH

3A6110191C

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA 0B 6225	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
	A. NEW	U	U	NA	NL	☒ YES ☐ NO	A. WORK UNIT

10. NO./CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	61101A	3A161101A91C	00	010
b. CONTRIBUTING				
c. CONTRIBUTING				

11. TITLE (Precede with Security Classification Code)*

(U) Electronic Wet Bulb Globe Temperature Instrument

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

002400 Bioengineering; 009800 Medical and Hospital Equipment

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7710	7809	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR	PRECEDING 77	0.0	00
	CURRENT 78	0.2	09

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

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20. PERFORMING ORGANIZATION

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TELEPHONE: (301) 663-7277; AUTOVON 343-7277

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME:

NAME:

21. GENERAL USE

Foreign Intelligence Not Applicable

POC:DA

22. KEYWORDS (Precede EACH with Security Classification Code)

(U) Fatigue; (U) Comfort; (U) Humidity; (U) Thermistor; (U) Heat Exhaustion

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) Design, fabricate and evaluate an electronic instrument; independent of external power sources and which will measure the three temperatures used to compute the Wet Bulb Globe Temperature (WBGT) index and in addition display the index.

24. (U) Investigate electronic methods to produce accurate analogs of the temperatures used to compute the WBGT index.

25. (U) None.

*Available to contractors upon originator's approval.

ELECTRONIC WET BULB GLOBE TEMPERATURE INSTRUMENT

3A161101A91C.00.010

Detail Sheet

1. BACKGROUND.

Hot weather risks to troops undergoing training are conventionally assessed by the measurement of the Wet Bulb-Globe Temperature Index (WBGT Index). This is done using the standard WBGT Kit (NSN 6665-00-159-2218) consisting of a wet bulb, dry bulb, and black globe thermometer and slide rule, which automatically displays the WBGT Index based on the temperatures read on the thermometer.

Current models of the WBGT Kit use glass thermometers which are subject to breakage and in addition have become increasingly expensive to manufacture.

Because of advances in electronic technology in recent years, it should be possible to produce an instrument which will measure the WBGT index using thermistors, integrated circuit operational amplifier chips, and either an analog or digital display of the index with a direct read-out of the temperatures or index. The electronic unit would be battery powered and be lower in weight and volume than the current unit.

2. CONCLUSIONS.

This is a new work unit.

3. RECOMMENDATIONS.

It is recommended that effort be initiated on the development of an all electronic instrument for the measurement of the WBGT index.

4. REFERENCES.

a. D/F, SGRD-UBE-G to Commander, USAMBRDL, dated 16 September 1977, signed by R. J. O'Connor, subject: Development of an All Electronic Wet Bulb Globe Temperature (WBGT) Instrument, (ILIR Proposal).

b. D/F, SGRD-UBE-G, to Commander, USAMBRDL, dated 27 September 1977, signed by R. J. O'Connor, subject: Development of a All Electronic Wet Bulb Globe Temperature (WBGT) Instrument.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION* DA 0B 6226	2. DATE OF SUMMARY* 77 10 01	REPORT CONTROL SYMBOL DD-DR&E(AR)636
3. DATE PREV SUM'RY	4. KIND OF SUMMARY A. NEW	5. SUMMARY SCTY* U	6. WORK SECURITY* U	7. REGRADING* NA	8a. DISB'N INSTR'N NL	8b. SPECIFIC DATA-CONTRACTOR ACCESS ☒ YES ☐ NO	9. LEVEL OF SUM A. WORK UNIT

10. NO./CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	61101A	3A161101A91C	00	011
b. CONTRIBUTING				
c. CONTRIBUTING				

11. TITLE (Precede with Security Classification Code)* (U) Testing an On-Line Total Organic Carbon Monitor, the Electrochemical Organic Content (EOC) Analyzer

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*
007800 Hygiene and Sanitation; 003400 Civil Engineering

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7610	CONT	DA	C. In-House

17. CONTRACT/GRANT
a. DATES/EFFECTIVE: EXPIRATION:
b. NUMBER:*
c. TYPE: d. AMOUNT:
e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR	PRECEDING 77	0.0	00
	CURRENT 78	0.4	13

19. RESPONSIBLE DOD ORGANIZATION
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20. PERFORMING ORGANIZATION
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NAME:* Cooper, W.J.
TELEPHONE: (301) 663-2036; AUTOVON 343-2036
SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS
NAME: Peterman, B.W.
NAME: Cowen, W.F. POC:DA

21. GENERAL USE
Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Electrochemical Organic Content Analyzer; (U) Total Organic Carbon; (U) On-Line Analyzers; (U) Water Reuse

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To evaluate an electrochemical organic content analyzer for on-line monitoring applications in wastewater reuse, unit process control, and pollution control.

24. (U) The electrochemical organic content analyzer will be compared to standard total organic carbon measurements to determine its applicability for on-line, real-time monitoring of product waters from the MUST Water Processing Element; and other applications, including general wastewater reuse water quality monitoring and process control; process and pollution control for Army industrial operations, such as munitions production; and research applications, such as the monitoring of chemical concentrations during the conduct of aquatic bioassays.

25. (U) None.

*Available to contractors upon originator's approval.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA 0B 6227	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
	A. NEW	U	U	NA	NL	[X] YES [ ] NO	A. WORK UNIT

10. NO./CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	61101A	3A161101A91C	00	012
b. CONTRIBUTING				
c. CONTRIBUTING				

11. TITLE (Precede with Security Classification Code)* (U) Development of Techniques for the Concentration and Detection of Enteric Viruses in Water and Wastewater

12. SCIENTIFIC AND TECHNOLOGICAL AREAS* 008700 Laboratories, Test Facilities and Test Equipment; 007800 Hygiene and Sanitation; 005900 Environmental Biology

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7710	7809	DA	C. In-House

17. CONTRACT/GRANT
a. DATES/EFFECTIVE: EXPIRATION:
b. NUMBER:*
c. TYPE: d. AMOUNT:
e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 77	0.0	00
FISCAL YEAR CURRENT 78	1.1	47

19. RESPONSIBLE DOD ORGANIZATION
NAME:* US Army Medical Bioengineering Research & Development Laboratory
ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL
NAME: Dettor, C.M., COL
TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION
NAME:* US Army Medical Bioengineering Research & Development Laboratory
ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)
NAME:* Schaub, S.A.
TELEPHONE: (301) 663-2036; AUTOVON 343-2036
SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS
NAME: Taylor, G.W.
NAME: Rose, W.E. POC:DA

21. GENERAL USE
Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code)
(U) Virus; (U) Detection; (U) Water; (U) Wastewater

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To evaluate commercial filtration techniques for compatability with the bentonite virus adsorption methodology for rapid, easy concentration of viruses from water and wastewater. To evaluate various means of eluting viruses from the clay entrapped on the filters for subsequent virus assay or ultimate concentration techniques.

24. (U) Filtration and elution techniques will be evaluated to determine feasibility of conducting virus assays for water quality monitoring in conjunction with the development of field water treatment equipment; operation of wastewater treatment plants at fixed installations; development of wastewater reuse technology; and the conduct of epidemiologic and other research studies.

25. (U) None.

*Available to contractors upon originator's approval.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA 0B 6222	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISP'N INSTR'N	8b. SPECIFIC DATA - CONTRACTOR ACCESS	9. LEVEL OF SUM
	A. NEW	U	U	NA	NL	[X] YES [ ] NO	A. WORK UNIT

10. NO. CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	61101A	3A161101A91C	00	013
b. CONTRIBUTING				
c. CONTRIBUTING				

11. TITLE (Precede with Security Classification Code)*

(U) Characterization of ULV Spray Particle Spectra

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

002400 Bioengineering; 002600 Biology

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7710	7809	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 77	0.0	00
FISCAL YEAR CURRENT 78	0.2	10

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

NAME: Dettor, C.M., COL

TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* Schiefer, B.A.

TELEPHONE: (301) 663-2835; AUTOVON 343-2835

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Gula, P.R.

NAME: Nelson, J.H. POC:DA

21. GENERAL USE

Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Ultra Low Volume (ULV); (U) Pesticide Aerosol Measurement; (U) Particle Size; (U) Vector Control; (U) Pest Management

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To characterize size of aerosol particles produced from various chemical formulations and distribution patterns produced by various pesticide dispersal units used within Army vector control/pest management programs.

24. (U) A commercially available device designed to measure particle size will be utilized. Initial comparisons will be made with various EPA ultra low volume (ULV) registered pesticides, refined mineral oil and other non-toxic chemicals to find a chemical which can be used in all machines to compare equipment characteristics. Pesticide aerosol clouds produced by commonly used pesticide dispersal units will be characterized by determining distance and height to which various size particles are carried. After optimum distance for collecting samples is determined by type of machine, all makes and models of sprayers used in Army pest management programs will be tested. Information obtained will be used in the design and modification of ULV equipment and serve as a basis for future work in ultra low volume applications.

25. (U) None.

*Available to contractors upon originator's approval.

Characterization of ULV Spray Particle Spectra
3A161101A91C.00.013

Detail Sheet

1. Background:

A commercially available device designed to measure particle size will be utilized to characterize size of spray particles produced from various chemical formulations and distribution patterns produced by various pesticide dispersal units used within Army vector control/pest management programs. Initial comparisons will be made with various EPA ultra low volume (ULV) registered pesticides, refined mineral oil and other non-toxic chemicals to find a chemical which can be used in all machines to compare equipment characteristics. Pesticide aerosol clouds produced by commonly used pesticide dispersal units will be characterized by determining distance and height to which various size particles are carried. After optimum distance for collecting samples is determined by type of machine, all makes and models of sprayers used in Army pest management programs will be tested. Information obtained will be used in the design and modification of ULV equipment and serve as a basis for future work in ultra low volume applications.

2. Conclusions:

N/A

3. Recommendations:

That this research be initiated in the 91C project area.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION* DA 0B 6064	2. DATE OF SUMMARY* 77 10 01	REPORT CONTROL SYMBOL DD-DR&E(AR)636
3. DATE PREV SUM'RY 77 06 05	4. KIND OF SUMMARY K. COMPLETION	5. SUMMARY SCTY* U	6. WORK SECURITY* U	7. REGRADING* NA	8a. DISB'N INSTR'N NL	8b. SPECIFIC DATA - CONTRACTOR ACCESS [X] YES [ ] NO	9. LEVEL OF SUM A. WORK UNIT

10. NO./CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	61101A	3A161101A91C	00	068
b. CONTRIBUTING				
c. CONTRIBUTING				

11. TITLE (Precede with Security Classification Code)*

(U) Pest Management Dispersal and Survey Devices

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

009800 Medical and Hospital Equipment; 002400 Bioengineering

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7507	7706	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR	PRECEDING 77	0.3	09
	CURRENT 78	0.0	00

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

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20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering Research & Development Laboratory

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PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* Parsons, R.E.

TELEPHONE: (301) 663-7237; AUTOVON 343-7237

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Lockwood, W.A.

NAME: POC:DA

21. GENERAL USE

Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code)

(U) Survey Devices; (U) Vectors; (U) Bait Trap; (U) Mosquitoes; (U) Pests

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To develop pest management survey devices for use by military or civilian entomologists, preventive medicine technicians and pest control operators conducting surveys for arthropod disease vectors or pest insects.

24. (U) Prototype devices will be designed and fabricated. Initial field evaluations will be conducted by US Army Medical Bioengineering Research & Development Laboratory personnel and subsequently by potential user agencies.

25. (U) 7610 - 7706. A prototype bait trap was fabricated and tested in the Panama Canal Zone. Several required modifications were identified during the tests. These were incorporated into a final design.

*Available to contractors upon originator's approval.

DD FORM 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A, 1 NOV 68 AND 1498-1, 1 MAR 69 (FOR ARMY USE) ARE OBSOLETE.

Pest Management Dispersal and Survey Devices

3A161101910.00.068

Detail Sheet

1. Background:

The most basic technique of catching medically important or pestiferous mosquitoes or other flying insects has been to use a suitable bait to attract host-seeking females, and human bait has been used for many years to collect anthrophilic species. Later developments included inclosing human or animal baits in nets, cages or traps which, in theory at least, permitted the unhindered entry of mosquitoes, but prevented their escape. Light traps, especially in North America, have for the most part replaced human and animal baits as routine sampling techniques. However, according to Hocking (1971) no really effective attractant has been found to replace a natural host and consequently human bait catches remain the most single useful technique to collect anthropophilic mosquitoes. Service (1976) provides the most up-to-date information on human bait catches and equipment for use thereof.

The original trap utilizing animal or human bait was the Magoon (1935) trap. Various modifications of this trap have been made over the years but basically the method of attracting the female mosquito to the bait and collecting it while feeding, landing, or resting after feeding, has not changed considerably from trap to trap. The bait trap described offers the unique potential of collecting mosquitoes attracted to humans without exposure to bites by the mosquitoes. This will allow collections to be made in areas where diseases such as malaria, mosquito-borne encephalitis, etc. are prevalent without endangering the collectors to these diseases during the sampling hours.

A prototype trap similar to the one described was fabricated at the US Army Medical Bioengineering Research and Development Laboratory, Fort Detrick, Maryland and tested in the Panama Canal Zone in March 1977. The trap successfully collected mosquitoes, especially Anopheles albimanus, but several basic deficiencies were noted that decreased the overall efficiency of the trap. The trap was modified to correct the identified problems and a final prototype constructed (Figure 1).

The sides of the trap are constructed of non-metallic fiberglass insect screen, 22 mesh count. The sides are 76" x 52" and contain 2" slit openings 14" above the ground. A 3" beveled flap extends from the bottom of the slit and angles up into the inner collection area. This provides free entry for the mosquitoes, yet prevents easy exit from the trap.

The front of the trap is fitted with a brass zippered entrance 40" high with a bottom width of 48". The zipper is double-sided and can be manipulated from inside or outside the trap.

The key to trapping the mosquitoes is the two collection chambers located on each side of the trap. They are 76" x 52" x 12" and are sewed into the main trap body. Each innermost side of the collection area is fitted with six sleeves. This allows the collector inside to collect the trapped mosquitoes without exposure to bites.

The trap frame consists of two 1-1/2" side poles 52" long and two 1-1/2" poles 67" long. An aluminum rod 76" x 3" x 1" supports the top and provides overall rigidity for the trap. The trap body is secured to the frame by nylon tie-downs.

The trap can be set up or taken down by two persons in approximately ten minutes. The total weight is about thirty pounds and is easily transported in a custom made canvas carrying case.

2. Conclusions:

The trap would provide collectors a safe method of collecting adult mosquitoes in areas where mosquito-borne diseases are prevalent.

3. Recommendations:

The item has been fabricated, field tested and modified. Conclusions have been published in appropriate scientific journal. The trap is not recommended for progression into the program development cycle at this time.

4. References:

a. Hocking, B. (1971). Blood-sucking behavior of terrestial arthropods. A. Rev. Ent., 16, 1-26.

b. Magoon, E.H. (1935). A portable stable trap for capturing mosquitoes. Bull. ent. Res., 26, 363-369.

c. Service, M.W. (1976). Mosquito ecology, field sampling techniques. John Wiley and Sons, N.Y. & Toronto. xii plus 583 pp.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA 0B 6220	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
77 06 01	D. CHANGE	U	U	NA	NL	[X] YES [ ] NO	A. WORK UNIT

10. NO./CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	61101A	3A161101A91C	00	300
b. CONTRIBUTING				
c. CONTRIBUTING				

11. TITLE (Precede with Security Classification Code)*
(U) Cockroach Surveillance Devices

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*
005900 Environmental Biology; 009800 Medical and Hospital Equipment

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7810	7906	DA	C. In-House

17. CONTRACT/GRANT
a. DATES/EFFECTIVE: EXPIRATION:
b. NUMBER:*
c. TYPE: d. AMOUNT:
e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 77	0.1	02
FISCAL YEAR CURRENT 78	0.2	15

19. RESPONSIBLE DOD ORGANIZATION
NAME:* US Army Medical Bioengineering Research & Development Laboratory
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RESPONSIBLE INDIVIDUAL
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20. PERFORMING ORGANIZATION
NAME:* US Army Medical Bioengineering Research & Development Laboratory
ADDRESS:* Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic institution)
NAME:* Desrosiers, R.E.
TELEPHONE: (301) 663-7237; AUTOVON 343-7237
SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS
NAME: Schiefer, B.A.
NAME: Driggers, D.P. POC:DA

21. GENERAL USE
Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code)
(U) Survey Devices; (U) Cockroach; (U) Pest Control; (U) Pest Management

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To develop cockroach survey devices for use by military or civilian entomologists, environmental health technicians and pest control operators.

24. (U) Commercially available and/or prototype devices will be identified and/or designed and fabricated. Initial field evaluations will be conducted by US Army Medical Bioengineering Research & Development Laboratory personnel and subsequently by potential user agencies.

25. (U) 7706 - 7709. Three candidate cockroach survey devices have been identified: the Roatel, the Zoecon Detector, and the SHOCK'M'ALL electric baseboard cockroach traps. Quantities of each type of device have been secured. A cockroach rearing program has been established to support the survey project. Some preliminary investigations have been conducted to acquaint Pest Management Systems Branch personnel with the survey devices.

*Available to contractors upon originator's approval.

Cockroach Surveillance Devices
3A161101A91C.00.300

Detail Sheet

1. Background:

Three commercially available cockroach traps have been identified as potential cockroach survey devices: the Roatel®; the Zoecon Detector®; and the SHOCK'M'ALL electric baseboard cockroach traps. Quantities of each trap have been acquired, and some preliminary investigations have been conducted to familiarize Pest Management Systems Branch personnel with these devices.

A laboratory experiment has been designed to determine 1) which unit will capture the greatest percentage of the test population; 2) if the devices are biased toward specific instars of cockroach; and 3) which unit(s) can provide consistent trapping data.

Observations will be made to determine the convenience and labor required to set up and collect the traps and count the insects. The cost of the traps, life expectancy estimates and maintenance requirements will be determined and cost per trap day will be ascertained. At the conclusion of the laboratory experiment, the traps will be evaluated under field conditions.

2. Conclusions:

Preliminary work indicates that the 3 traps are potentially useful survey devices.

3. Recommendations:

Further evaluation of the traps should be conducted in FY78 to examine specific operating characteristics of each, and ultimately determine which unit(s) can be used most efficiently in a cockroach surveillance program.

4. References:

DF, DASG-HCL to USAMRDC, dated 4 June 1976, subject: Vector Control and Pesticide Dispersal Equipment.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA OB 6168	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8A. DISB'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
76 10 01	K. COMPLETION	U	U	NA	NL	[X] YES [ ] NO	A. WORK UNIT

10 NO CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	61101A	3A161101A91C	00	301
b. CONTRIBUTING				
c. CONTRIBUTING				

11 TITLE (Precede with Security Classification Code)*

(U) Sublethal Effects of Pollutants/Stress on Blood Chemistry Values in Fish

12 SCIENTIFIC AND TECHNOLOGICAL AREAS*

005900 Environmental Biology; 002600 Biology

13 START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7601	7710	DA	C. In-House

17 CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 77	0.7	51
FISCAL YEAR CURRENT 78	0.0	00

19. RESPONSIBLE DOD ORGANIZATION

NAME:* US Army Medical Bioengineering

ADDRESS:* Research & Development Laboratory
Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL

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TELEPHONE: (301) 663-2434; AUTOVON 343-2434

20. PERFORMING ORGANIZATION

NAME:* US Army Medical Bioengineering

ADDRESS:* Research & Development Laboratory
Fort Detrick, Frederick, MD 21701

PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)

NAME:* Warner, M.C.

TELEPHONE: (301) 663-2036; AUTOVON 343-2036

SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Pearson, J.G.

NAME: Muul, I. POC:DA

21. GENERAL USE

Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code)

(U) Aquatic Biology; (U) Fish Physiology; (U) Fish Hematology; (U) Fish Blood Chemistry

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) Development of baseline data for the utilization of fish blood chemistry values, fish respiration rates, and body color pattern changes as tools in determination of sublethal effects of pollutants/stress on fish.

24. (U) Systems were developed for the analysis of micro quantities of fish blood serum. Respiration rate studies were conducted by developing test chambers for holding fish and monitoring respiration rates. Baseline values were established for various species at a variety of temperatures. Pollutant-induced changes were then monitored. Color changes were studied in certain select species of fish. A variety of fish species and test vessels were evaluated. Susceptible fish species were exposed to a variety of pollutants and pollutant concentrations and color pattern changes were evaluated.

25. (U) 7610 - 7709. Research is completed on stability, population variations and effects of temperature on serum values. Additional work completed includes effects of anesthetics on whole blood and serum parameters. Baseline data now generated indicates that standardized techniques, currently in use, will provide reliable data in the study of sublethal effects of toxicants on fish blood. Four publications are in progress.

*Available to contractors upon originator's approval.

DETAIL SHEET

TITLE: Sublethal Effects of Pollutants/Stress on Blood Chemistry Values in Fish

WORK UNIT NO: 301

AGENCY ACCESSION NO: DAOB 6168

PROGRESS

Respiration Rates

Construction of a breathing rate chamber and electronic recording apparatus was completed and is currently in use for shakedown tests.

An electrical drive system for the syringe injector on proportional diluters was designed, built, and tested.

Blood Chemistry

Studies on variation and stability of blood serum and effects of temperature on analytical results were completed.

Extensive draft literature and data summaries were completed on: clinical significance; effects on aquatic organisms, chemistry of analysis; and synopsis of research findings for albumin, glucose, blood urea nitrogen, creatinine, sodium, potassium, and calcium.

Study on effects of diazinon and diazinon-HCl reaction mixture on blood and brain cholinesterase levels was completed.

Technicon Blood Gas Analyzer was purchased and personnel attended school on operation of instrument.

Study of effects of four types of fish anesthetics and selected whole blood and serum parameters was completed.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA 0B 6169	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISB'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
76 10 01	H. TERMINATION	U	U	NA	NL	☒ YES ☐ NO	A. WORK UNIT

10. NO./CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	61101A	3A161101A91C	00	302
b. CONTRIBUTING				
c. CONTRIBUTING				

11. TITLE (Precede with Security Classification Code)* (U) Mechanism of the Reaction of Bromine and Polyhydric Phenols to Form Brominated Methane Compounds

12. SCIENTIFIC AND TECHNOLOGICAL AREAS* 007800 Hygiene and Sanitation; 003400 Civil Engineering

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7512	7707	DA	C. In-House

17. CONTRACT/GRANT
a. DATES/EFFECTIVE: EXPIRATION:
b. NUMBER:*
c. TYPE: d. AMOUNT:
e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 77	0.2	09
FISCAL YEAR CURRENT 78	0.0	00

19. RESPONSIBLE DOD ORGANIZATION
NAME:* US Army Medical Bioengineering Research & Development Laboratory
ADDRESS:* Fort Detrick, Frederick, MD 21701

RESPONSIBLE INDIVIDUAL
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20. PERFORMING ORGANIZATION
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TELEPHONE: (301) 663-2036; AUTOVON 343-2036
SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS
NAME: Rosenblatt, D.H.
NAME: Wade, C.W. POC:DA

21. GENERAL USE
Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code)
(U) Bromination; (U) Water Analysis; (U) Water, Drinking; (U) Polyhydric Phenols

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To investigate the products formed as a result of reaction between bromine and polyhydric phenols in aqueous solution. To study the kinetics of the reaction between bromine and polyhydric phenols under conditions which might exist in military drinking water systems using bromine as a disinfectant (as the Navy is now doing).

24. (U) Aqueous solutions of the model compound will be contacted with bromine under controlled conditions of pH and temperature. Analyses of reaction products will be made after destruction of excess bromine with a reducing agent. Haloforms will be analyzed by headspace or stripping-trapping methods, using gas chromatography/mass spectrometry for quantitation/identification. A plasma chromatograph will also be used to detect brominated compounds. Non-volatile brominated phenols will be concentrated by freeze-drying and analyzed by gas chromatography/mass spectrometry.

25. (U) 7710 - 7709. A model compound, dimedone, was brominated and shown to form monobromodimedone at 1:1 molar ratio of bromine:dimedone, with only a trace yield of bromoform and dibromomethane. With a 2:1 molar ratio of bromine to dimedone, the bromoform yield was increased 300-fold over the 1:1 reaction. A mechanism of stepwise bromination to form dibromodimedone, followed by haloform reaction is proposed for the production of bromoform from dimedone.

*Available to contractors upon originator's approval.

DETAIL SHEET

TITLE: Mechanism of the Reaction of Bromine and Polyhydric Phenols to Form Brominated Methane Compounds

WORK UNIT NO: 302

AGENCY ACCESSION: DAOB 6169

PROGRESS

A model compound, dimedone, was brominated at a molar ratio of 1:1 (bromine:dimedone) at pH 7 and 25°C. Production of bromoform was found to be only 0.057% of the theoretical yield of one mole bromoform per mole of dimedone. At a 2:1 molar ratio of bromine to dimedone, the yield was increased to 16%, or 300-fold over that with a 1:1 ratio under the same conditions of temperature and pH. Similar tests with ultraviolet absorption scans of the reaction solutions demonstrated that the reaction was proceeding in a stepwise bromination via monobromodimedone and dibromodimedone. This was tested with UV scans of pure mono- and dibromodimedone synthesized according to literature procedures. A mechanism was proposed for the reaction pathway from dibromodimedone to the observed products of bromoform and dibromomethane, which is similar to the mechanism proposed for humic acid chlorination by other workers.

The technical report is being prepared for publication.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA OB 6174	77 09 30	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISS'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
76 10 01	K. COMPLETION	U	U	NA	NL	[X] YES [ ] NO	A. WORK UNIT

10. NO./CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	61101A	3A161101A91C	00	304
b. CONTRIBUTING				
c. CONTRIBUTING				

11. TITLE (Precede with Security Classification Code)* (U) Controlled-Release Pesticide Formulations, Electron Microscopic Degradation Evaluation

12. SCIENTIFIC AND TECHNOLOGICAL AREAS* 005900 Environmental Biology; 002600 Biology

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7603	7709	DA	C. In-House

17. CONTRACT/GRANT
a. DATES/EFFECTIVE: EXPIRATION:
b. NUMBER:*
c. TYPE: d. AMOUNT:
e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 77	0.3	08
FISCAL YEAR CURRENT 78	0.0	00

19. RESPONSIBLE DOD ORGANIZATION
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RESPONSIBLE INDIVIDUAL
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20. PERFORMING ORGANIZATION
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PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)
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SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS
NAME: Desrosiers, R.E.
NAME: Driggers, D.P. POC:DA

21. GENERAL USE
Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Controlled-Release; (U) Pesticide Formulations; (U) Degradation; (U) Electron Microscope

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) By utilizing the scanning electron microscope, develop a series of photomicrographs depicting degradation stages of controlled-release pesticide formulations that have shown potential for use in military pest management/vector control programs.

24. (U) Electron photomicrographs will be used to assess variations in physical degradation and allow visual comparison of degradation for estimating pesticide life in the controlled-release pesticide formulations.

25. (U) 7610 - 7709. Electron photomicrographs have been made, and it appears that this technique proved effective for evaluation of the degradation of the proposed controlled-release formulations. A technical report is being prepared.

*Available to contractors upon originator's approval.

DD FORM 1 MAR 68 1498 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A, 1 NOV 68 AND 1498-1, 1 MAR 68 (FOR ARMY USE) ARE OBSOLETE.

Controlled-Release Pesticide Formulations,
Electron Microscopic Degradation Evaluation
3A161101A91C.00.304

Detail Sheet

1. Background:

Controlled-release pesticide formulations have materially changed pest management/vector control programs. These formulations have significantly decreased the amounts of toxic residues impacting on the environment and thereby substantially reducing the threat of environmental insults. Additionally, substantial decreases in requirements for dispersal equipment and manpower are also realized. Several carrier systems for controlled-release pesticide formulations have been developed and tested, including cement (Laird 1967), charcoal (Barnes 1967), rubber (Schultz 1969), plaster-of-paris (McDonald 1970), polyvinyl chloride (Wilkinson 1971), chlorinated polyethylene (Nelson 1976), castorwax (Sjogren 1975), and silicate (Sjogren 1975). With the exception of the castorwax and silicate formulations, all of the above-mentioned carrier systems are relatively inert to physical, chemical, and biological breakdown within the environment. When introduced into an aquatic habitat, this characteristic of non-degradability makes these carrier materials objectionable and unacceptable for long-term use. An experimental silicate carrier system developed by the Biological Transport Laboratory of Washington University at St. Louis, MO, conceptually satisfied the immediate need for a physically degradable pesticide carrier material while remaining economically feasible. The pesticide release mechanism is a simple physical deterioration of the carrier with a consequent release of the insecticidal moiety.

The purpose of this research was to evaluate the stages of physical deterioration of 2 environmentally degradable controlled-release pesticide formulations. The physical decomposition of the formulations was assessed on a time lapse basis and recorded on electron photomicrographs utilizing a scanning electron microscope. Rates of decomposition and mode of degradation (flaking, splitting, rupturing, leaching, and/or dissolving) was ascertained temporally upon exposure within the aquatic environment.

2. Conclusions:

This technique proved effective for evaluation of the degradation of the proposed controlled-release formulations.

3. Recommendations:

This research has been completed. A Technical Report will be prepared.

4. References:

a. Approved in-house research task, March 1976.

b. Barnes, W.W., Webb, A.B., Savage, L.B. (1967). Mosquito News 27, 488-490.

c. Laird, M. (1967). WHO Chron. 21, 18-26.

d. McDonald, J.L., Dickens, T.H. (1970). Mosquito News 30, 563-566.

e. Nelson, J.H., Evans, E.S., Pennington, N.E., and Meisch, M.V. (1976). Mosquito News 36, 47-51.

f. Schultz, H.A., Webb, A.B. (1969). Mosquito News 29, 38-41.

g. Sjogren, R.D., Thies, C. (1975). Proc. 1975 Int'l CR Pest. Symp. 2, 217-221.

h. Wilkinson, R.N., Barnes, W.W., Gillogly, A.R. and Minnemeyer, C.D. (1971). J. Econ. Entomol. 64, 1-3.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA 0B 6175	77 09 30	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISB'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
76 10 01	H. TERMINATION	U	U	NA	NL	[X] YES [ ] NO	A. WORK UNIT

10. NO. CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	61101A	3A161101A91C	00	305
b. CONTRIBUTING				
c. CONTRIBUTING				

11. TITLE (Precede with Security Classification Code)*

(U) Pesticide Formulations, Controlled-Release, Environmentally Compatible

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

005900 Environmental Biology; 002600 Biology

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7603	7709	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 77	1.0	34
FISCAL YEAR CURRENT 78	0.0	00

19. RESPONSIBLE DOD ORGANIZATION

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NAME: Desrosiers, R.E. POC:DA

21. GENERAL USE

Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Pesticide Formulations; (U) Controlled-Release; (U) Environmental Compatibility; (U) Pest Management; (U) Mosquito Control

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To identify, develop, and evaluate environmentally compatible controlled-release pesticide formulations of military relevance for use in support of tactical operations and fixed military installation pest management/vector control programs.

24. (U) Review of literature, reports, etc. will be made to identify existing controlled-release formulations potentially suitable for military use. Conduct laboratory and field evaluations to assess their military applicability. If available compounds are found unsuitable, develop alternative formulations.

25. (U) 7610 - 7709. A commercially available developmental inhibitor, Altosid isopropyl(2E,4E)-11-methoxy-3,7,11-trimethyl-2,4-dodecadienoate, was identified as an outstanding candidate for formulation into a controlled-release configuration. The parent formulation, however, had a serious shortcoming in that its duration of effectiveness was only 10-14 days. The material was formulated onto sand granules and evaluated under laboratory conditions. Results of these tests indicate that the Altosid coated sand granule formulation provided control of one mosquito species for up to 45.5 days and control of another species for up to 48 days. Two additional formulations are presently being evaluated in the laboratory. This research will be terminated in the 91C program and resumed in the 836 program effective October 1977.

*Available to contractors upon originator's approval

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Pesticide Formulations, Controlled Release, Environmentally Compatible

3A161101A91C.00.305

Detail Sheet

1. Background:

An operational need exists for longer lasting environmentally compatible pesticide formulations. Arthropod-borne diseases have caused great losses in military manpower in the past and without adequate control can be expected to affect military operations in the future. The once relied upon long-lasting, broad spectrum pesticides like DDT and other organochlorine compounds have been removed from the market and are no longer available. The newer compounds (organophosphates and carbamates) are short-lived, have a relatively short shelf life and are overall militarily less acceptable. These shortcomings can be overcome through the application of the current state-of-the-art by formulating these materials or others into a controlled-release environmentally degradable matrix.

The objective of this research therefore was to identify, develop, and evaluate environmentally compatible controlled-release pesticide formulations of military relevance for use in support of tactical operations and fixed military installations pest management/vector control programs.

A commercially available developmental inhibitor, Altosid(R), isopropyl (2E,4E)-11-methoxy-3,7,11-trimethyl-2,4-dodecadienoate, was identified as an outstanding candidate for formulation into a controlled-release configuration. The compound as it is presently marketed has many advantages over classical toxic pesticides including low mammalian toxicity (acute oral LD_{50} to rats >34,600 mg/kg), and environmental compatibility with non-target organisms; however, a serious shortcoming of the compound is its lack of persistence in aqueous media. Depending upon conditions, the compound's duration of effectiveness is 10-14 days.

With the expectation of increasing the duration of effectiveness of the compound using readily available, inexpensive materials, a formulation was prepared using the parent compound adhered onto sand granules. Laboratory tests using two important vector mosquito species were begun in order to determine actual duration of control; to determine formulation degradation rates; and to establish dosage-response data for the formulation against these mosquito species.

2. Conclusions:

a. Results of these tests indicate that the Altosid(R) coated sand granule formulation provided control of Aedes aegypti for up to 45.5 days and control of Culex pipiens pipiens for up to 48 days; a 3.3 fold extension over the duration of the commercially available formulation for the former species and a 3.4 fold extension for the latter species.

Pesticide Formulations, Controlled Release, Environmentally Compatible

Conclusions cont'd.

b. Two additional formulations are presently being evaluated in the laboratory.

3. Recommendations:

a. That additional, actual or simulated field tests be conducted to determine the effectiveness of the material under a variety of ecological conditions.

b. That new, commercial compounds, as they become available, be evaluated under actual and field conditions for potential military use.

c. That this research be terminated in the 91C program and resumed in the 832 program.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA 0B 6197	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISB'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
76 10 01	D. CHANGE	U	U	NA	NL	[X] YES [ ] NO	A. WORK UNIT

10. NO./CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	61101A	3A161101A91C	00	306
b. CONTRIBUTING				
c. CONTRIBUTING				

11. TITLE (Precede with Security Classification Code)*

(U) Bioluminescent Unicellular Monitors of Water Quality

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

010100 Microbiology; 012600 Pharmacology; 016800 Toxicology

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7710	7809	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 77	0.1	06
FISCAL YEAR CURRENT 78	0.1	03

19. RESPONSIBLE DOD ORGANIZATION

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ASSOCIATE INVESTIGATORS

NAME:

NAME: POC:DA

21. GENERAL USE

Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code)

(U) Bioassay; (U) Water Quality; (U) Microorganisms; (U) Bioluminescent

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To study the feasibility of using single-celled organisms with bioluminescent capacity as water quality monitors.

24. (U) A colony of the test organism shall be grown in a synthetic aqueous medium. Individual toxins identified in the MUST reuse water shall be tested. Dose-response curves shall be computed where bacterial luminescence is affected by the chemicals tested. The sub-tasks are as follows: (1) Define a liquid synthetic culture medium for maintenance of the photobacteria; (2) establish measurement parameters and techniques using the photometer; (3) measure baseline activity of bioluminescence; (4) determine the nature (stimulation or inhibition) and time-course of response to toxic substances; and (5) optimize response time and sensitivity of the test system.

25. (U) 7610 - 7709. The bioluminescence of two species of luminescent bacteria (Vibrio fischeri and Lucibacterium harveyi) were measured as a function of time.

*Available to contractors upon originator's approval.

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DETAIL SHEET

TITLE: Bioluminescent Unicellular Monitors of Water Quality

WORK UNIT NO: 306

AGENCY ACCESSION: DAOB 6197

PROGRESS

The bioluminescence of two species of luminescent bacteria (Vibrio fischeri and Lucibacterium harveyi) were measured as a function of time. With bacteria grown in test tubes, luminescence increases to peak activity 8-12 hours following inoculation of the culture medium. It then continues to decline and practically no luminescence is measurable after 36 hours. Two species of bacteria were tested to determine whether their nutritive requirements differed. An optimal concentration of the nutrients (peptone, tryptone and bacto-yeast extract) does exist for each species, and a different concentration was required for maximum luminescence in the two species tested. The intensity of peak luminescence differed between the two species under the test conditions.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
				DA 0B 6198	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
76 10 01	D. CHANGE	U	U	NA	NL	[X] YES [ ] NO	A. WORK UNIT

10. NO /CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	61101A	3A161101A91C	00	307
b. CONTRIBUTING				
c. CONTRIBUTING				

11. TITLE (Precede with Security Classification Code)*

(U) Mechanisms for the Chemical Degradation of Military Pesticide Formulations

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

007800 Hygiene and Sanitation; 003300 Chemical Engineering; 003400 Civil Engineering

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7610	7809	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR	PRECEDING 77	0.1	12
	CURRENT 78	0.2	11

19. RESPONSIBLE DOD ORGANIZATION

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ASSOCIATE INVESTIGATORS

NAME: Cooper, W.J.

NAME: Dennis, W.H. POC:DA

21. GENERAL USE

Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Chemical Degradation; (U) Mechanisms; (U) Pesticides; (U) Solid Waste; (U) Ultimate Disposal; (U) Chlorine Chemistry

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To define and explain the mechanisms for the chemical degradation of diazinon and similar compounds by HOCl and for the catalytic dechlorination of organochlorine pesticides using nickel and sodium borohydride. These reactions have been identified as potential methods for chemical degradation of excess military pesticides and pesticide formulations.

24. (U) Methods for degradation of diazinon using aqueous HOCl (Clorox) and for the catalytic dechlorination of DDT, heptachlor and chlordane, and lindane have been developed by USAMBRDL. Mechanisms for the chemical reactions have been proposed but not investigated in detail. Laboratory studies will be performed to identify intermediate products and to explain the mechanisms for their production.

25. (U) 7610 - 7709. Military formulations of lindane were successfully dechlorinated using the nickel borohydride system. Three solvent systems (ethanol, methanol and 2-propanol) were shown to be acceptable for dechlorination of lindane. USAMBRDL Technical Report 7702, "Nickel Boride Catalyzed Dechlorination of Several Organochlorine Pesticides" was completed.

*Available to contractors upon originator's approval.

DETAIL SHEET

TITLE: Mechanisms for the Chemical Degradation of Military Pesticide Formulations

WORK UNIT NO: 307

AGENCY ACCESSION: DAOB 6198

PROGRESS

Previous efforts at USAMBRDL have been successful in identifying methods for chemical degradation of military pesticides and pesticide formulations. Reaction products have been identified and reaction mechanisms have been postulated. However, the reaction mechanisms have not been proven by detailed chemical studies. These mechanisms represent novel pathways both for chlorination and dechlorination of organic compounds.

The dechlorination mechanism involves the in situ generation of Ni_2B with the addition of excess $NaBH_4$. A previous effort had demonstrated that this approach will dechlorinate organochlorine pesticides. However, no studies were performed to determine how effective this method was with actual pesticide formulations. Additional studies were also required to evaluate solvent effects on the individual pesticide reactions and to verify that the source of hydrogen for dechlorination was indeed the $NaBH_4$ as proposed by the reported mechanism.

The chlorination mechanism involves the reaction of HOCl (Clorox®) with an organophosphorus pesticide, diazinon. This reaction involves the oxidation of an aromatic pyrimidine system to produce products including acetic acid, trichloroacetic acid and chloroform. The chlorination process involves ring opening to produce a stable monochloro intermediate. However, no dichloro intermediate is observed in the production of the final products, trichloroacetic acid and chloroform. This mechanism is unique in that it indicates either the formation of a carbanion intermediate or a very reactive dichloro intermediate. Understanding this mechanism would be very useful in predicting products from similar reactions with other aromatic systems (such as in pesticide degradation, disinfection of wastewater, etc.).

USAMBRDL Technical Report 7702, "Nickel Boride Catalyzed Dechlorination of Several Organochlorine Pesticides," was published. This report presents the results of previous effort in studying the Ni_2B system. Additional studies have shown that this system will completely dechlorinate military formulations of lindane. Complete dechlorination of lindane

was observed in three different solvents, methanol, ethanol and 2-propanol. Methods for preparation of the model compounds for the diazinon/HOCl system have been found in the literature. Some problems are anticipated in analysis of these compounds and their chlorinated products; however, the combined use of gas chromatography (electron capture and flame ionization detectors) and liquid chromatography (variable wavelength UV detector) should overcome these problems.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION* DA 0B 6200	2. DATE OF SUMMARY* 77 10 01	REPORT CONTROL SYMBOL DD-DR&E(AR)636
3. DATE PREV SUM'RY 76 10 01	4. KIND OF SUMMARY D. CHANGE	5. SUMMARY SCTY* U	6. WORK SECURITY* U	7. REGRADING* NA	8a. DISB'N INSTR'N NL	8b. SPECIFIC DATA-CONTRACTOR ACCESS [X] YES [ ] NO

9. LEVEL OF SUM	A. WORK UNIT

10. NO./CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	61101A	3A161101A91C	00	308
b. CONTRIBUTING				
c. CONTRIBUTING				

11. TITLE (Precede with Security Classification Code)*

(U) Mechanism of Disinfection of Virus by Aqueous Free and Combined Chlorine

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

007800 Hygiene and Sanitation; 003400 Civil Engineering

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7710	7809	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR	PRECEDING 77	0.2	11
	CURRENT 78	0.2	12

19. RESPONSIBLE DOD ORGANIZATION

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21. GENERAL USE

Foreign Intelligence Not Applicable

20. PERFORMING ORGANIZATION

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SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME:

NAME: POC:DA

22. KEYWORDS (Precede EACH with Security Classification Code)

(U) Disinfection; (U) Virology; (U) Mechanism; (U) Chlorination

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To investigate the chemical reactions occurring in a virus undergoing disinfection by free or combined chlorine. To determine the loci of chlorine interaction with nucleic acid bases. To investigate the mechanism of viral nucleic acid insertion into a host cell after virus disinfection. To study reactions of halogens nucleotides.

24. (U) Aqueous solutions of f2 virus will be disinfected by HO36Cl or NH236Cl between pH 5 and 10. Inactive virus will be isolated: RNA extracted, hydrolyzed and nucleotides separated by electrophoresis. The 36Cl in nucleotides will be determined. The ability of disinfected f2 to insert 14C or 3H labeled nucleic acid into a host cell. Study the rates of halogen consumption of various nucleotides.

25. (U) During FY77 a method for the isolation of chlorine inactivated f2 was developed and the rate of incorporation of 36Cl into f2 determined at pH 5.7 and 10; this was correlated to the rate of f2 inactivation. It was determined that, at pH 5, 87 percent of all 36Cl was incorporated into the f2 RNA. At pH 7.6 and 10.0, 73 percent and 60 percent of the bound chlorine was associated with the RNA, respectively. The rate at which nucleotides, CMP and AMP, consume chlorine increases with decreasing pH. GMP consumes chlorine more rapidly with increasing pH. At pH 10, GMP is the only nucleotide that reacts with chlorine. UMP is unreactive between pH 5.6 and 10.

*Available to contractors upon originator's approval.

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* U.S. GPO: 1974—540-843/8691

DETAIL SHEET

TITLE: Mechanism of Disinfection of Virus by Aqueous Free and Combined Chlorine

WORK UNIT NO: 308

AGENCY ACCESSION: DAOB 6200

PROGRESS

Since 1908 the chlorination of U.S. water supplies has grown and the incidence of waterborne diseases has declined. During ensuing years numerous studies have been carried out concerning the chemistry of aqueous chlorine, the effect of chlorine on various bacteria and viruses and the effect of various physical factors that influence the disinfection of microorganisms. These studies have shown viruses to be generally more resistant than bacteria to inactivation by aqueous chlorine at various levels of pH. In contrast, little is known concerning the mechanism by which aqueous chlorine species destroy the biological function of viruses or bacteria. This lack of understanding is due in part to the very effectiveness of chlorine as a disinfectant. This has resulted in little effort to study the fundamental action of chlorine on biological materials. In addition to this, the complexity of viral organisms as a model for study, the difficulty in obtaining clean viral preparations and the presence of multiple chlorine species in aqueous media have contributed to the lack of study on the fundamental mechanisms of virus inactivation.

The importance of chlorination of water supplies for the prevention of waterborne diseases impels an understanding of the manner in which chlorine acts upon viruses. Presently, improvements in the disinfection process are mainly sought empirically. However, if the mechanism by which chlorine species inactivates virus could be determined, then this knowledge could lead to the optimization of chlorine use or better define the conditions under which disinfection may be improved.

During FY76 f2 bacterial virus was exposed for various periods of time to levels of aqueous radioactive $HO^{36}Cl/O^{36}Cl^-$ below 1 mg/l of free chlorine between pH 5.6 and 10.0. The reaction mixtures were quenched with thiosulfate, assayed for viable f2, and incorporation of ^{36}Cl measured. The rate of f2 inactivation by free Cl paralleled the rate of ^{36}Cl incorporation into the virus. Both rates were rapid at pH 5.6 and sluggish at pH 10.0. The virus samples were then separated into protein and RNA components by phenol extraction and the ^{36}Cl activity was determined in each fraction. At the pH of 5.6, where f2 inactivation was most

rapid, 87% of ^{36}Cl bound to f2 was found in the RNA during disinfection by $HO^{36}Cl$. At pH 7.6 and 10.0 there were respectively 73% and 60% of bound ^{36}Cl associated with the RNA. Although RNA comprises only 28% of the f2 by weight, it appears that RNA has greater affinity for chlorine between pH 5.6 and 10.0 than does protein.

During FY77 the rate of disinfection of f2 virus was found parallel the rate of ^{36}Cl incorporation into the virus when radioactive monochloramine, $NH_2{}^{36}Cl$, was used as a disinfectant. It was found that both rates were considerably slower than the corresponding rates with free chlorine. After 3 logs of inactivation, 63% of all bound chlorine was found in viral RNA.

Through probability theory it was determined that when f2 is exposed to aqueous free HOCl, only a single hit by chlorine is required to inactivate f2 at pH 10 and 7. At pH 5, more than a single hit is required for inactivation.

In addition to the chemical binding of chlorine to biological structures of f2 virus which may be detected by radiological techniques, redox reactions between virus and hypochlorous acid or hypochlorite ion were assessed. The redox reaction between hypochlorous acid or hypochlorite ion and f2 virus became more prominent as the pH increased. Therefore, disinfection was more rapid when redox reactions were least important.

In order to gain information about the potential reactions that occur in viral RNA during disinfection, the four nucleotides were reacted with solutions of hypochlorous acid in the 5.0 to 10.0 pH range. It was expected that the chemical behavior of RNA toward chlorine may be similar to the action of chlorine on the nucleotides.

The rate of chlorine consumption by individual nucleotides was determined under conditions where the concentration of nucleotide was greater than that of free chlorine. This should show the rate of the first reaction that would occur during the reaction of hypochlorous acid or hypochlorite ion with the nucleotide. The most rapid consumption of chlorine was observed at pH 5.5 by CMP and by AMP. At pH 7.0, in addition to CMP and AMP, GMP became a significant consumer of chlorine. However, the rates of chlorine consumption for both CMP and AMP were slower than at pH 5.5. At pH 10, GMP was found to be the only significant consumer of chlorine; furthermore the rate of consumption of chlorine by GMP was actually greater at pH 10 than at 7.0. Since the rates of chlorine consumption followed first order kinetics a half-life could be determined.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA 0B 6201	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISP'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
76 10 01	H. TERMINATION	U	U	NA	NL	[X] YES [ ] NO	A. WORK UNIT

10. NO. CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	61101A	3A161101A91C	00	309
b. CONTRIBUTING				
c. CONTRIBUTING				

11. TITLE (Precede with Security Classification Code)*

(U) Immunochemical Technology Measurements in Field Medical Environments

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

002300 Biochemistry; 002600 Biology; 008800 Life Support

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7610	7709	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 77	0.1	01
FISCAL YEAR CURRENT 78	0.0	00

19. RESPONSIBLE DOD ORGANIZATION

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SOCIAL SECURITY ACCOUNT NUMBER:

ASSOCIATE INVESTIGATORS

NAME: Rice, R.M.

NAME: Shiotsuka, R.N. POC:DA

21. GENERAL USE

Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code)

(U) Immunology; (U) Biochemistry; (U) Field Measurements; (U) Physiology

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To examine the feasibility of detecting environmental pollutants through employment of immunochemical techniques.

24. (U) The absorption of antibodies and enzymes on latex particles can provide a simple method or methods of detection of a wide variety of air and water/liquid pollutants within the field medical environment.

25. (U) 7610 - 7709. Terminated: Investigator is no longer with the laboratory. USAMBRDL Technical Report 7712, "An Antibody Technique for Detecting Small Molecular Weight Substances in Water: A Feasibility Study," September 1977 was published.

*Available to contractors upon originator's approval

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA 0B 6202	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISB'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
76 10 01	D. CHANGE	U	U	NA	NL	☒ YES ☐ NO	A. WORK UNIT

10. NO./CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	61101A	3A161101A91C	00	310
b. CONTRIBUTING				
c. CONTRIBUTING				

11. TITLE (Precede with Security Classification Code)*

(U) Non-Auditory Dependent Blood Pressure Measurement Techniques

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

009800 Medical and Hospital Equipment

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7610	7810	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR	PRECEDING 77	0.1	02
	CURRENT 78	0.3	09

19. RESPONSIBLE DOD ORGANIZATION

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ASSOCIATE INVESTIGATORS

NAME:

NAME:

21. GENERAL USE

Foreign Intelligence Not Applicable

POC:DA

22. KEYWORDS (Precede EACH with Security Classification Code)

(U) Blood Pressure; (U) Pressure Detection; (U) Sphygmomanometer; (U) Korotkov

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To develop a method of obtaining blood pressure readings of critical patients in the high noise environments of emergency evacuation vehicles (helicopter, ambulance, etc.) where Korotkov sounds can not be heard.

24. (U) A standard Sphygmomanometer will have a pressure transducer installed in the pressurizing line. The pressure variations induced in the line when the cuff pressure is in the range of the blood pressure will be detected. Electronic processing will provide a visual signal at the on-set of pulsations (systolic) and remove the visual signal when the pulsation coincide with diastolic. The visual signal will cue the taking of pressure readings just as the Korotkov sounds do now and can be used in conjunction with the sounds where ambient noise permits use of conventional stethoscope.

25. (U) 7610 - 7709. An I.C. pressure transducer (National Semi-Conductor L X 1602G) is used to detect cuff pressure. Capacity coupling permits separation of the pulsatile pressure from the steady state cuff pressure. Additional gain and low pass filtering provides good replication of the blood pressure wave form. Because of individual variations simple electronic techniques have not provided reliable correlation with Korotkov sounds. More sophisticated techniques will be tried.

*Available to contractors upon originator's approval

NON-AUDITORY DEPENDENT BLOOD PRESSURE MEASUREMENT TECHNIQUES

3A161101A91C.00.310

Detail Sheet

1. BACKGROUND.

There is a continuing and growing need to monitor the blood pressure of critical patients in high noise environments (ambulances, helicopters, etc.). The present technique depends upon detection of Korotkov sounds by some method and the reading of cuff pressure when these sounds appear (systolic) and disappear (diastolic). In a high noise environment these sounds are difficult to impossible to detect and the readings obtained are highly unreliable.

The objective of this effort was to detect electronically the pulsations visable on the manometer indicator when the cuff pressure is in the range of the blood pressure. This was to be an inexpensive add-on to the standard sphygmomanometer and would provide a visual instead of auditory cue to the systolic pressure and diastolic pressure points.

An integrated pressure transducer (National Semi-Conductor L X 1602G) was placed in the cuff line in parallel with the manometer. The output of the transducer was capacity coupled (to eliminate the steady state component) to a preamplifier and low pass filter. This signal was recorded and attempts were made to correlate the output with the presence of Korotkov sounds.

The system provides good replication of the blood pressure wave form, but a simple technique (signal on-set, peak detection or rise time) could not be developed which would provide a reliable read-out. This was the result of signal level variations with cuff position and different individuals.

2. CONCLUSIONS.

A simple signal detection technique does not provide a reliable indicator of the pressure range of interest. Visual inspection of the wave form does permit determination of the pressure range. Therefore, a more sophisticated pattern recognition technique could be developed which could be used in a high noise environment.

3. RECOMMENDATIONS.

Since there is still a need to be able to monitor blood pressure in high noise environments, it is recommended that this effort be continued.

4. REFERENCES.

a. Memo, SGRD-UBE-G to Commander, USAMBRDL, dated 21 April 1976, signed by Lloyd L. Salisbury, Jr., Subject: Establishment of ILIR Project for the Investigation of Non-Auditory Dependent Blood Pressure Measurement Techniques.

b. Memo, SGRD-UBE-G to Commander, USAMBRDL, dated 21 May 1976, Subject: High Noise Blood Pressure Measurement.

c. A Technique for Measuring Blood Pressure in a Medical Evacuation Helicopter, by Peacock, Webber, Kuhn and Waits, the Journal of Trauma, Vol. 15 #11, Nov 1975, page 999-1002.

d. Continuous Non-Invasive Blood Pressure Monitor, by Franklin R. Borkat, et al, Department of Navy, 20 October 1975.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA 0B 6203	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISB'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
76 10 01	D. CHANGE	U	U	NA	NL	☒ YES ☐ NO	A. WORK UNIT

10. NO. CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	61101A	3A161101A91C	00	311
b. CONTRIBUTING				
c. CONTRIBUTING				

11. TITLE (Precede with Security Classification Code)*

(U) Sterilization Techniques Using High Boiling-Point Fluids

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

010100 Microbiology; 009800 Medical and Hospital Equipment

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7609	7809	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 77	0.0	01
FISCAL YEAR CURRENT 78	0.1	05

19. RESPONSIBLE DOD ORGANIZATION

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ASSOCIATE INVESTIGATORS

NAME:

NAME:

21. GENERAL USE

Foreign Intelligence Not Applicable

POC:DA

22. KEYWORDS (Precede EACH with Security Classification Code)

(U) Sterilizers; (U) Field Sterilizers; (U) Fluids; (U) High Boiling Point

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To search for high boiling-point fluids effective as sterilization media at much lower positive pressures than in current steam sterilization practice.

24. (U) Complete a literature search for non-toxic, non-corrosive candidate fluids. Modify controls of a standard steam sterilizer to operate at lower positive pressures corresponding to 250-270 F saturation temperatures of these fluids. Measure killing ability with spore strips.

25. (U) 7610 - 7709. A literature search revealed butanol as the only compound with the desired characteristics; mixtures of fluids were not investigated. Cycles were run using two table-top sterilizers of the same design. Both sterilizers suffered the same valve failure (not believed to be associated with the use of butanol) before spore strip tests could be run.

*Available to contractors upon originator's approval.

STERILIZATION TECHNIQUES USING HIGH-BOILING-POINT FLUIDS

3A161101A91C.00.311

Detail Sheet

1. BACKGROUND.

The use of a sterilant with a higher boiling-point than water would allow sterilization at usual temperatures ($\tilde{\sim}$ 270°F) but at much lower pressures. This could result in substantial weight and cost reductions in field sterilizers due to thinner pressure chamber walls and in safer equipment.

A literature search for a candidate fluid uncovered only one compound (Butanol) with the desired characteristics; mixtures of fluids have not been investigated. At atmospheric pressure, Butanol boils at 117.6°C (243.7°F) and its saturation pressure at 132°C (269.6°F), a common sterilizing temperature, is 9.6 psi. This compares to a saturation pressure of over 27 psi for water at 132°C.

Two Spectroline Table-Top Sterilizers were acquired and cycles were run using steam sterilization indicators with water as the sterilant. One of the sterilizers suffered a valve failure at this stage. Butanol was then used in the second sterilizer after minor readjustment of its thermal controller. Results appeared normal, but after only four cycles, the same valve failed in the second sterilizer. This valve is believed to be an inherent weakness in the sterilizer design which was not necessarily aggravated by the use of Butanol.

2. CONCLUSIONS.

Thermodynamically, the use of Butanol in a sterilizer is satisfactory. Structural problems are lessened as expected. The killing power of Butanol as a sterilant has not yet been measured.

3. RECOMMENDATIONS.

Complete preliminary tests and calibration of sterilizers with Butanol and assess killing ability with spore strips.

4. REFERENCES.

None.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA 0B 6204	77 03 25	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8A. DISB'N INSTR'N	8B. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
76 10 01	H. TERMINATION	U	U	NA	NL	X YES ☐ NO	A. WORK UNIT

10. NO CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	61101A	3A161101A91C	00	312
b. CONTRIBUTING				
c. CONTRIBUTING				

11. TITLE (Precede with Security Classification Code)*

(U) Sterilization Time-Temperature Indicator

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*

010100 Microbiology; 009800 Medical and Hospital Equipment

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7610	7809	DA	C. In-House

17. CONTRACT/GRANT

a. DATES/EFFECTIVE: EXPIRATION:

b. NUMBER:*

c. TYPE: d. AMOUNT:

e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 77	0.1	09
FISCAL YEAR CURRENT 78	0.0	00

19. RESPONSIBLE DOD ORGANIZATION

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ASSOCIATE INVESTIGATORS

NAME:

NAME:

21. GENERAL USE

Foreign Intelligence Not Applicable

POC:DA

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Sterilization; (U) Sterilization Indicator; (U) Time-Temperature Indicator; (U) Medical

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To develop a reusable time-temperature indicator that is direct reading in giving the number of minutes that indicator has been exposed at or above a designated sterilization temperature. Indicator is to be placed directly into packs which are steam autoclaved and will give a reliable indication of function of sterilization equipment and sterility of pack.

24. (U) Two approaches will be investigated:

a. A mechanical clock type timer which is simultaneously set to zero and wound prior to each use. A bimetallic strip will prevent the timer from functioning until the designated temperature is reached. If temperature falls below the value, timer will stop. If temperature once again reaches the designated value, timer will record, therefore face of timer will indicate total time at (or above) selected temperature.

b. Electronic solid state timers which will have their voltage supply (such as a battery) cut off by a thermostatic switch to accomplish same function described above for the mechanical unit.

25. (U) 7610 - 7703. Study indicates that mechanical and electronic timers capable of withstanding repetitive high temperature sterilization conditions will be difficult to fabricate and expensive to produce. A new commerical steam sterilization integrator ("Therma-log S"), appears to provide a superior sterilization indicator and makes such development undesirable at this time. Pending resolution of economic availability of the commercial indicator and a complete evaluation of its functional capability, subject task is being terminated, subject to reopening at a later date.

*Available to contractors upon originator's approval.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA 0B 6216	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISB'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
77 05 11	D. CHANGE	U	U	NA	NL	[X] YES [ ] NO	A. WORK UNIT

10. NO CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	61101A	3A161101A91C	00	312
b. CONTRIBUTING				
c. CONTRIBUTING				

11. TITLE (Precede with Security Classification Code)* (U) Compilation and Improvement of Statistical Methods for Binary Responses, the Analysis of Aquatic Field Data and Laboratory Toxicology Data

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*
009700 Mathematics and Statistics; 002600 Biology; 016800 Toxicology

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7710	7809	DA	C. In-House

17. CONTRACT/GRANT
a. DATES/EFFECTIVE: EXPIRATION:
b. NUMBER:*
c. TYPE: d. AMOUNT:
e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR	PRECEDING 77	0.1	05
	CURRENT 78	0.3	06

19. RESPONSIBLE DOD ORGANIZATION
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ASSOCIATE INVESTIGATORS
NAME: Pearson, J.G.
NAME: POC:DA

21. GENERAL USE
Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Binary Response; (U) Statistical Analysis; (U) Aquatic Field Data; (U) Laboratory Toxicology Data

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) Review existing methods and modify or develop new methods for the analysis of aquatic field data and laboratory toxicology data.

24. (U) Literature will be reviewed in those areas indicated above for current methods of data analysis. Current methods will be critically examined and modified or new ones developed where warranted. Methods of analysis for acute and chronic laboratory toxicity data will be evaluated with special reference to aquatic toxicity tests.

25. (U) 7703 - 7709. Graphical approximation techniques and moving average techniques have been evaluated. Part of the work done on probit analysis has been studied. Some recent developments in emphasizing logit have been obtained. A statistics package call SAS has been deemed to be more satisfactory than two routines now available for probit analysis.

*Available to contractors upon originator's approval.

DETAIL SHEET

TITLE: Compilation and Improvement of Statistical Methods for Binary Responses, the Analysis of Aquatic Field Data and Laboratory Toxicology Data

WORK UNIT NO: 312

AGENCY ACCESSION: DAOB 6216

PROGRESS

A summary of activity includes two primary areas. One is the collection and evaluation of work relating to median response level from dichotomous responses. The other is the preparation of ideas from data collected in the laboratory and in the field.

Historically, several methods have been given for calculating a measure which would represent an exposure level that would kill one-half of the exposed individuals. One could say that empirical needs and observations preceded much of the mathematical development. Through procedures of estimation, complicated analyses have been presented. Since much of this work was done before computers were available, alternate procedures were developed. This has meant, for relatively new areas like aquatic bioassay, that less than satisfactory methods of analysis have been applied and that some have been applied improperly.

To date, graphical methods and moving average methods have been evaluated. Both had been used by bioassayists as alternatives to the more statistically sophisticated methods of probit and logit. Part of the work by Finney on probit has been well studied and a new awareness of recent developments in logit exists because of this work.

Some statistical packages for probit estimates were evaluated. One package that looks particularly promising is Statistical Analysis System (SAS). It not only presents the desired statistical summaries but also graphs the data and the weighted regression line. It has options for plots on the original concentration scale or a transformed concentration scale.

A meeting in Minneapolis, MN, on the data analysis of aquatic field data was attended in May 1977.

Measurements like the amount of chlorophyll present from artification substrate collections are particularly variable. Results for sample size requirements and studies to detect orientation and spacing differences are still preliminary.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY

1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL
DA 0B 6224	77 10 01	DD-DR&E(AR)636

3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8a. DISB'N INSTR'N	8b. SPECIFIC DATA-CONTRACTOR ACCESS	9. LEVEL OF SUM
77 08 01	D. CHANGE	U	U	NA	NL	☒ YES ☐ NO	A. WORK UNIT

10. NO./CODES:*	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER
a. PRIMARY	61101A	3A161101A91C	00	315
b. CONTRIBUTING				
c. CONTRIBUTING				

11. TITLE (Precede with Security Classification Code)* (U) Development of System for Laboratory Evaluation of Biological Control Potential of Arthropod Pathogens for Medically Important Arthropods

12. SCIENTIFIC AND TECHNOLOGICAL AREAS*
005900 Environmental Biology; 002600 Biology

13. START DATE	14. ESTIMATED COMPLETION DATE	15. FUNDING AGENCY	16. PERFORMANCE METHOD
7708	7909	DA	C. In-House

17. CONTRACT/GRANT
a. DATES/EFFECTIVE: EXPIRATION:
b. NUMBER:*
c. TYPE: d. AMOUNT:
e. KIND OF AWARD: f. CUM. AMT.

18. RESOURCES ESTIMATE	a. PROFESSIONAL MAN YRS	b. FUNDS (In thousands)
FISCAL YEAR PRECEDING 77	0.2	04
FISCAL YEAR CURRENT 78	1.2	40

19. RESPONSIBLE DOD ORGANIZATION
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NAME: Nelson, J.H. POC:DA

21. GENERAL USE
Foreign Intelligence Not Applicable

22. KEYWORDS (Precede EACH with Security Classification Code) (U) Pathobiology; (U) Insect Pathology; (U) Disease Vectors; (U) Arthropod Control; (U) Biological Control; (U) Integrated Control

23. TECHNICAL OBJECTIVE,* 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)

23. (U) To develop a system for laboratory evaluation of biological control potential of arthropod pathogens for arthropods of medical importance.

24. (U) Using mosquito host-pathogen systems available from previous work in Thailand as models, an experimental system will be developed to evaluate the biological control potential of arthropod pathogens for arthropods of medical importance. Laboratory evaluations using this system will subsequently be preliminary to field evaluations of selected pathogens showing great potential as biological control agents when used alone or as elements in integrated disease vector control programs.

25. (U) 7708 - 7709. Necessary personnel, equipment and supply funding levels have been established. Pathogens from Thailand have been transported to this laboratory and established in maintenance cultures. The supporting mosquito colonies are being enlarged. Necessary modification of laboratory space is underway. Supplies and equipment are being accumulated.

*Available to contractors upon originator's approval.

Development of System for Laboratory Evaluation
of Biological Control Potential of Arthropod
Pathogens for Medically Important Arthropods
3A161101A91C.00.315

Detail Sheet

1. Background:

Insect pathogens are being used effectively to control agricultural and forest insect pests, alone or as elements of integrated pest control systems. It is possible that insect pathogens also would be useful for the control of medically important arthropods. Use of biological control agents would reduce environmental contamination with chemical insecticides and provide additional technology to combat pest populations that are developing resistance to many currently available insecticides. Such agents must be safe and efficacious.

Many pathogens of medically important arthropods, especially mosquitoes, have been found and reported in the literature. It is unlikely that all of these will meet the requirements of being safe, efficient and economical as biological control agents. Therefore, a system for screening pathogens to select those worthy of development as biological control agents is being developed. This system will consist of a series of observations and experiments designed to provide, at minimum cost, the knowledge of a pathogen necessary to assess its potential usefulness as a biological control agent. Pathogens of Aedes aegypti, the vector of dengue fever and yellow fever, that were found in Thailand will be used as models to test concepts and protocols.

Two pathogens of Aedes aegypti were transported from Thailand to USAMBRDL. One, a vertically transmissible microsporidan, was transported in infected ova and has been successfully established in the laboratory. The other, a Helicosporidan, known to be storable in liquid nitrogen, in a Revco or under refrigeration at 4°C for up to three months with negligible loss of infectivity, was transported in dry ice. Transmission of this pathogen in the laboratory was achieved but at a rate too low for continued propagation. Additional material shipped in wet ice or liquid nitrogen has been requested.

2. Conclusions:

Temporary storage or international shipment of Helicosporidan insect pathogens should not be attempted until the effects of carbon dioxide on survival of the pathogen are determined.

3. Recommendations:

This project should continue at a high level of activity.

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